TRENDS IN EDUCATION

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Modern Mathematics
The New History
Sixth Form Physics
General Studies
Education of Immigrants
The Disadvantaged Child
Educational Cruises
Co-education

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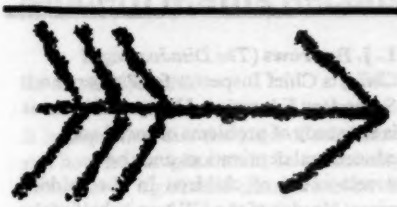

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"Too many innovations for the ordinary teacher . . . changing content at too great a pace." A critical look at some new secondary school practices.

Modern Maths Reconsidered

R. C. LYNESS

It is important that the kind of mathematics being taught in schools, and how it is taught should be continually appraised. There have been a number of significant changes and developments during this century and the pace of suggested change has considerably increased during the last decade. Many parts of mathematics which in the past were taught only to older and abler pupils are being introduced earlier and to a wider ability range. This article is concerned principally with the content of recent courses advocated for pupils in secondary schools and usually appearing under the title 'modern mathematics'.

'Modern mathematics' is in some ways an unfortunate term. Many non-mathematicians think of it as some new subject, different from mathematics. This new subject, some say, is what every progressive headmaster ought to introduce into his school. If 'progressive' is equated with 'believing that anything modern is better' one might agree: but if 'progressive' means 'believing in change for the better' then we should withhold general introduction of 'modern mathematics' until we know it *is* better. How are we to know this? If we are not mathematicians (and often, too, if we are) because other people whose opinions we respect tell us so.

But there are large numbers of headmasters and others who are given conflicting opinions by reputable persons about the worth of modern mathematics. There are the favourable opinions of many of the schools trying out new materials and of the authors of the many new text books on 'modern mathematics', and there are unfavourable opinions from industrialists and teachers in schools and higher education.*

Claims

Those who favour modern mathematics often claim that pupils find it more interesting and enjoyable, that they understand it better and are more successful in passing examinations based upon it, that the mathematical topics considered are more relevant to the modern world and that they stress more 'basic' and 'unifying' ideas. Sometimes these claims are accompanied by statements that school mathematics of the past engendered dislike, anxiety and failure and that teachers of the past, though they may have been better qualified as mathematicians, taught the subject in stupid and inhuman ways.

The non-mathematician is particularly prone to believe that this dislike and failure, which he may well have himself experienced, was due to

* See the *Bulletin of the Institute of Mathematics and its Applications*, Oct. 1968 "On the enfeeblement of mathematical skills by 'modern mathematics' and by similar soft intellectual trash in schools and universities". J. M. Hammersley.

the nature of the old subject and perhaps to his teachers, but he is unwise to believe that dislike and failure will in the long run be removed just by changing over to the 'new subject'.

In the short run the enterprising teacher who adopts a 'modern' syllabus, will enjoy the challenge of unfamiliarity, and will communicate enthusiasm to his pupils. His ignorance in the early stages may be compensated by his enthusiasm and a genuinely joint participation in discovery with his class. What of the ordinary teacher, who prefers to teach what he knows and understands and can illustrate from a fund of experience?

Ordinary Reactions

The ordinary teacher, of course, introduces new material into his teaching. The 'newness' may be limited to a puzzle in the local newspaper or the current football league table or to developments from some new question raised by a pupil in class discussion. He is not necessarily an unenterprising teacher because he does not introduce modern mathematics. There are teachers who themselves enjoy new branches of mathematics but do not consider them so suitable as traditional material for their pupils. They do not believe that the new material will be as successful as the old in realising their aims in teaching mathematics. Success for the pupil is all-important and there is good evidence that pupils of moderate ability find some modern material easier than those parts of traditional mathematics which most projects omit. Investigating Venn diagrams, networks, magic squares, is easier than solving heavy algebraic equations, geometrical riders and problems about taps filling emptying baths.

This easiness is something different from the initial easiness of examination questions on new material. It is an easiness which a traditional teacher might equate with triviality. To him the reformist argument often appears to be 'As only able pupils in the past could do mathematics we must alter mathematics to something different so that less able pupils can do it. In particular we must take the calculating starch and manipulative dressing out of it, because average pupils cannot carry out calculations and manipulations successfully. We cannot expect them to be logical, so intuitive argument will be sufficient. It is the ideas that matter. Techniques can be acquired later by those who need them. What matters is mathematical activity, finding out for oneself the answers to questions one asks oneself. The child's mathematics is more important than the mathematics in the examination syllabus.'

Anyone who has taught the less able must have sympathy with this 'trivialisation' of mathematics. When it amounts to simplification through clarification it must command assent from everyone. And insofar as modern material stimulates interest and confidence, some improvement in the ability to calculate, manipulate, to argue logically and to refine ideas may be added. The traditionalists would argue that traditional material will do just as well if it is kept free of the complications and ingenuity which generations of teachers have added and have come with familiarity to regard as easy—easier for them than the unfamiliar new material.

Reformers want the ordinary teacher to learn new mathematics so that it is no longer unfamiliar and difficult. He can do this himself working through one or two of many new school textbooks with their teachers'

guides. Failure to understand is unlikely because books are increasingly written for children to read. Failure to be moved is unlikely because most modern topics have their exciting moments which the mathematically experienced will appreciate.* For the teacher who wants to try out something new with his pupils, a trouble at present is that most modern textbooks and examination syllabuses include in them too many new topics. He may be forgiven for believing that to be different from the traditional is a main aim for the writers.

Examinations

It is claimed that pupils following modern courses are more successful in examinations. Indeed some publicity has been given to the idea that modern mathematics must be better because a greater proportion of the O-level entry on a particular modern syllabus has passed than on the traditional syllabus. The examination board rightly justified this higher pass rate because it corresponded roughly to the average rate at which the schools taking the modern examination used to pass the traditional examination. Guinea-pigs should not be allowed to suffer. But, of course, the higher pass-rate proves nothing about the superiority of the syllabus; neither does it indicate that candidates generally will find it easier to pass. Certainly the more straightforward short questions in some new examinations are easier to answer correctly, but it should be remembered that it is not necessarily easier to pass on an easy paper if the candidates as a whole find it easy.

Modernity

I pass now to the claims that modern mathematics is more relevant to the modern world, and stresses more 'basic' and 'unifying' ideas. For these claims to be examined it is necessary to be more precise about 'modern mathematics'.

Professor W. W. Sawyer, of Toronto, in his lead paper to the Commonwealth Conference on Mathematics in School (Trinidad, September 1968) writes 'I do not accept any meaning of the "new mathematics" or "modern mathematics" other than the research advances since 1900. As commonly misapplied these phases are used to give prestige to any teaching innovation, good, bad or indifferent.' According to this definition much of what is in new syllabuses is not 'modern' mathematics. Computer-oriented mathematics and some of this century's developments in statistics and abstract algebra would be the chief qualifiers under Sawyer's definition. Indeed, some so-called 'modern' topics are resuscitations of what has been discarded in the past; numbers to bases other than ten, Euler's formula for polyhedra, probability. It is perhaps best in spite of Sawyer's definition, to consider as a 'modern' topic anything now in school syllabuses which has not recently been present.†

Relevance to the Modern World

Some knowledge of the computer is an essential ingredient of the

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* Indeed many teachers feel that most modern topics are not suitable below the sixth form because they need more mathematical experience to give them point.

† See *Mathematics Projects in British Secondary Schools* published 1968 by G. Bell & Sons Ltd., for the Mathematical Association. This gives an analysis of modern syllabuses.

school curriculum. To understand circuits and logical design are specialist objectives but it is possible to get a glimpse of these by working with circuit boards and learning some Boolean algebra. Some modern syllabuses for schools include such topics. These objectives are worthy applications of physics and mathematics, provided they are not allowed to become too complicated.

To analyse a process by means of a flow diagram, so that after each stop there can be no doubt as to what the next step is, and so that the performance of the successive steps must lead to the desired result, is a worthwhile educational pursuit and can of course be undertaken without any intention of using a computer.

To learn a programming language is to learn what steps the computer can take and the way in which it can be instructed to carry them out. Learning to programme is analogous to learning any language. However, it takes very little time. The language is exact and there are no inconsistencies. The vocabulary is very small. It demands accuracy and constant checking to see that the rules are exactly obeyed. It is a good clerical discipline and the logic involved is a good follow-up to flow diagrams. To programme successfully a series of increasingly difficult exercises and see the results from the computer is intellectually satisfying and enables one to appreciate the power of the computer. Many schools now have access to a computer and a small and relatively inexpensive schools' computer has been designed and is being tried out.

Statistics is also a subject which has obvious relevance to the modern world. In the lower forms of schools, work on averages and spreads of data has for many years been common as part of 'graphical representation'. Now some welcome work on probability has been introduced. Probability had been discarded from higher certificate syllabuses because it amounted largely to tricky problems on permutations and combinations. There is a similar danger that mechanics may be discarded from A-level syllabuses because too much time is spent preparing for over-complicated questions which have come to be asked in examinations. Statistics is often taken as an alternative to mechanics. Both should be present in the course taken by intending scientists and technologists. Some mechanics should be taught in the mathematics of lower forms as illustrating the value of mathematics as an aid to learning science. Mechanics is much more valuable than the topic grandiosely called 'linear programming'* which at school has nothing to do with computers but consists of a limited set of artificial problems on inequalities represented graphically with the object of maximising some quantity (e.g. profit). Both probability and linear programming have found favour with teachers who like to use set notation, though both at school level can as easily be learned without this notation.

Basic and Unifying Ideas

This brings me to the claim that modern mathematics deals with 'basic and 'unifying' ideas without which no one can understand mathematics. Arising out of work on the foundations of mathematics, certain ideas have been categorised and beautifully developed this century by the French 'Bourbaki' school of mathematicians. What are these ideas? Sets, relations, operations; special structures like number systems, special relations like implication, isomorphism. It is impossible to do

* Rather like calling problems on trains overtaking each other, 'Relativity'.

mathematics (and indeed, to think at all) without using such ideas, just as it is impossible to speak and write without using parts of speech and rules of grammar. Most non-mathematical readers who have heard talk of this kind of modern mathematics, should consider the position of a person who has spoken and written all his life, and who thinks he knows how to communicate and reason, using his language, though largely ignorant of its grammar. Is he to believe that he does not *understand* what he is saying when he says 'pass the mustard' because he doesn't know that 'pass' is the imperative mood of a transitive verb, 'the' is an indeclinable definite article, etc.

'Still,' it may be argued, 'it does help if you know some grammar.' This is undoubtedly true and there can be little objection to learning Bourbakist mathematics in the sixth form when there is sufficient experience to give it more point and where axiomatic thinking is more likely to be enjoyed. And earlier, wherever there are significant and common experiences which clearly can be described better by using 'new' terminology, it should be used. Thus there is no harm in children saying 'commutative operation' or 'multiplicative inverse' when it helps them to do so. But to learn about intersection and union of sets with accompanying notation in order to write $(x : x \epsilon Z, x^2 = 3) = \phi$, i.e. there is no whole number whose square is 3, is pedantry; and to turn a rectangular piece of cardboard round and about so as to make a group table is, for young children, no more amusing than considering taps filling emptying baths.

'The introduction of new terms and concepts should be preceded by sufficient concrete preparation and followed by genuine, challenging applications and not by thin and pointless material: one must motivate and apply a new concept if one wishes to convince an intelligent youngster that the concept warrants attention.'*

A unifying thread is as difficult to find in most modern textbooks as in the 'general mathematics' textbooks of the past and unifying ideas are rarely explicity mentioned by reformers. Some, like 'set' and 'transformation', are merely newish labels for what has always been present and recognised in all mathematics. The recognition of common structures is present in all thinking, but a particular mathematical structure, the group, has been singled out to be introduced in lower forms of secondary schools far in advance of any naturally interesting applications. Strange work on 'clock arithmetic', cardboard twisting, and the theory of number systems is introduced to give some point to this work on groups. 'Unifying ideas are present in all systems of knowledge and the argument about them concerns when and how they should become explicit instead of being used unconsciously.'†

Conclusion

School mathematics has been subject to a continuous process of reform throughout this century. Trigonometry, mechanics, calculus, algebraic geometry, statistics have all been introduced. There has been a reduction in the amount of technical skill expected from pupils,

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* *American Mathematical Monthly*, March 1962 'On the Mathematical Curriculum of the High School.' A memorandum signed by a group of 75 mathematicians, some in Industry, most in Universities.

† See A. W. Bell, *Higher Education Journal* 1.11. Autumn 1968, NUT. This issue has a special feature on Modern Mathematics.

particularly in the calculating processes of arithmetic and algebra and a reduction of the memorisation required in Euclid-based geometry. While the claims of present reformers that school mathematics has been stagnant must be rejected, the experimental work which they have undertaken has been valuable and stimulating. However, too many innovations for the ordinary teacher have been introduced and he has been expected to change content at too great a pace. It is better to teach well what one knows and has found to be of value than to fall a victim to 'modernisation' and teach badly what is unfamiliar and of doubtful value. Already reformers have realised that they have neglected too much traditional algebra and arithmetic. All modern courses contain traditional material, but there are too many which contain so much new material that everything, new and old, is treated in too slight a fashion. Mathematics for the abler half of our school population requires thoroughness, the learning of techniques, a proper challenge in problem-solving, and a firmer grasp of systematically developed areas of knowledge than can come from that fluttering over the surface which characterises many of today's courses.

It is right to match difficulty to ability and to recognise that much traditional material has been unjustifiably complicated. It is right to make some changes, particularly in methods, in the hope that they will be improvements. It is wrong to make wholesale changes in the belief that experiment has shown that they are necessary to achieve good and reasonable aims.

The use of social science methods, particularly quantification, in historial research has brought new vigour to the subject. This is beginning to affect the history taught in schools.

History and Social Science

ROBERT BEEVERS

None of us can be unaware of, or uninfluenced by, the enormous impetus deriving from the social sciences (economics, sociology, social psychology, anthropology, etc.) over the last twenty years. These are not new disciplines but, it seems, they have in their recent manifestations opened up new prospects for the understanding of the society of our time. At its most obvious it is to be seen in the study of mass behaviour, even in the prediction of such behaviour: we now accept opinion polls as rather more than entertaining political comment. Not a little of this achievement is the outcome of new techniques rather than of new concepts. The concepts may have been refined but it is doubtful whether, for example, our ideas about the nature of sociology have altered fundamentally since the days of Max Weber and Durkheim.

On the other hand this same period has been an age of anxiety for the study and teaching of history. While more historians have been turned out by the universities than ever before and more books of popular history published, and presumably read, the nature of history as an academic discipline has been questioned and its function in the educational system has been seriously challenged. Those who teach in schools find the typical history syllabus derided as remote from their pupils' interests and irrelevant to their needs, except for the purposes of examinations. Those who work in further education know that the study of history is conspicuously absent from the syllabuses of liberal studies whose purpose, we are told, is to provide that socially relevant kind of training without which the technologist is not properly educated. It is true that art history is now a compulsory element of courses for the diploma in art and design, but there are powerful voices that deplore this as an academic intrusion tending to inhibit the response of the art student to the contemporary social environment. History, declares a recent observer of the teaching scene, 'could lose the battle not only for its place in the curriculum, but for a place in the minds and interests of the young.'*

Teachers of history have tried to conciliate, if not to appease their critics in varied and often contradictory ways. They have emphasised, on the one hand, the specific and immediate in local history or, on the other hand, the general and remote in world history. The contemporary is promoted at the expense of the historic past (the word "ancient" is a kind of insult), social history at the expense of political and constitutional, all in the name of 'relevance'.

* Mary Price, "History in Danger" in *History* vol. liii, no. 179, October 1968.

In the light of these two contrasting situations—social scientists confident if not dogmatic and historians tenative and agnostic—it is not surprising to find a strong movement to displace history from its shaky foothold of two periods a week in the timetable and to replace it with something called social studies. While economics and sociology may be cited in this context, when one takes a close look at what is frequently taught the material is distinguished less by its method than by its content and time-scale. It is so highly contemporary that the phenomena it treats seem timeless; they have no origins, no growth and no dissolution. And they are as isolated from each other as from their past; they belong to no body politic. The historian tends to regard this movement with anxiety and a barely concealed contempt. But his problem remains: what alternative has he to offer?

A possible answer is emerging. And it is coming, one is glad to see, from the ranks of academic historians. Just as 'intellectual' has become a term of abuse, so 'academic' is frequently used as a synonym for irrelevant and, disturbingly, this is so in sections of the educational world. Any form of human endeavour can of course become sterile and nugatory but, as Professor Bantock has emphasised in his recent book *Culture, Industrialisation and Education*, academic study is essentially concerned with reality. And education which is not firmly based on the collective achievement of generations of scholars hardly deserves the name.

In the last decade a movement has arisen among historians asking new questions and using new methods to answer them, methods largely borrowed from the social sciences. Already this movement is firmly established in America and its achievements, both there and in Europe, have been solid enough to justify a non-specialist journal like *The Times Literary Supplement* devoting three issues to its significance during 1966 under the title of 'New Ways in History'.

The ideas behind the new history were summarised by Mr Keith Thomas of St John's College, Oxford in an article entitled 'The Tools and the Job',* which deserves close study by all teachers of history, and of social studies. It is impossible here to go over Thomas's argument in detail but one or two points he makes may be emphasised for their importance for the teaching of history in schools and colleges in the future.

In the first place the new history is characterised by techniques of research and analysis known as quantification. As suggested earlier we are familiar with the results of these techniques, usually in their more bizarre applications to our collective behaviour in a consumer economy; the contemporary scene would be duller, perhaps, without them. But we should not let these commercial associations obscure the fact that the alliance of mathematics and technology in the form of computers can extend our understanding of social phenomena, past as well as present, which previously lay beyond the range of reasoned analysis. In its economic context the application of quantitative techniques is known as econometrics. Using mathematically sophisticated techniques of measurement and elaborate theoretical models, problems which have long been debated among historians, such as the economic efficiency of slavery and the contribution of railways to American economic

* *T.L.S.*, April 7, 1966.

growth, appear at last to be open to definitive solution. In this country research tends to be concentrated on the industrial revolution with an emphasis on the features in a pre-industrial economy which presaged its transformation into the form we now recognise as characteristic of advanced societies.

It is, however, in the field of population study that some of the most remarkable and exciting extensions of our knowledge of the past and our comprehension of the present have been achieved. Originating in France, the application of statistical techniques to parish registers has led to the setting up in this country of the Cambridge Group for the History of Population and Social Structure. With the help of amateurs often organised in WEA and university extra mural classes, Mr Peter Laslett and Dr E. A.Wrigley have laid the basis for the study of population on a national scale, using materials long familiar to local historians. In their book *An Introduction to English Historical Demography* Mr Laslett and Dr Wrigley explain the process known as family reconstitution which can be built on the apparently simple records of births, marriages and deaths available in every parish, or county archive, in England. Such materials have, of course, long been used in the teaching of history in schools. Their use in association with modern demographic studies, however, not only demands new technical disciplines, it reduces the dangers of parochial antiquarianism by opening up new perspectives reaching from the past into the present and across national boundaries. The techniques themselves can be handled at various levels from simple aggregation to advanced statistics appropriate to differing ages and abilities of pupils.*

Quantification means, or should mean, a search for precision. The second aspect of the new history that I want to emphasise is its demand for accuracy of statement and of definition. Here we begin to impinge on the field of sociology. For, in its analysis of social structure, this discipline or group of disciplines insists above all on the substantiation of the terms of social thought. That with which we are all familiar is of course the word 'class' applied to gradations in society. We may often find ourselves questioning the validity of the criteria used by sociologists in attempting to give it a precise meaning. Nevertheless sociologists are at least aware of the problem. It is now demanded of us as historians that we should apply the same rigorous scrutiny to the terms we use, such as the ubiquitous middle class and that amorphous mass we call the people or, when we disapprove of what it does, the mob. It is no answer to reply that meanings may differ from one historical context to another. The fact remains that we need to know what we mean when we use these terms and that we should use a generally accepted currency among ourselves and among all students of society.

The value of this kind of exercise has been convincingly demonstrated by Professor George Rudé in his book *The Crowd in the French Revolution* which effectively demolishes some of the crude social categories too long accepted, and perpetuated, by historians in their treatment of this period. The establishment of new categories or models of social structure remains to be done. In attempting to do it, for this or any other period, historians who neglect the work of sociologists will do so at their peril.

* For an indication of the range of demographic studies see D. V. Glass and D. E. L. Eversley, *Population in History*, (London, 1965).

The methods of sociology and allied disciplines can take us further than this. One of the most interesting developments of recent years has come about by relating what is known about surviving primitive societies, as a result of the work of social anthropologists, to pre-industrial communities. This approach has thrown new light on medieval judicial practices and on such phenomena as witchcraft hitherto regarded as irrational and, therefore, inexplicable. The work of social psychologists obviously demands consideration in this context. It may also be used to illuminate the darker side of recent history as Professor Cohn of Sussex University has demonstrated in his researches into the origins of some Nazi theories and practices.*

It remains true nevertheless that the new history has largely proved effective in the study of industrial societies and particularly of urban communities. Most of the techniques derived from the social sciences can by applied to good effect in this context and historians have recognised this fact as the rapid growth of studies in urban history in recent years bears witness. The main lines of their work have been conveniently summarised in *The Study of Urban History* edited by Dr H. J. Dyos of Leicester University.

In examining the new history I have emphasised innovations of *method*. But there is, I believe, animating this whole movement an attitude to history, if not a philosophy, of great significance for the future of the subject, not only as an academic study but no less in teaching and education generally. Something of this attitude is indicated in Keith Thomas's article referred to above. In calling for a closer association of history and social science Thomas is not arguing for social history as against political and constitutional, even if he does regard the pre-occupation of historians with the latter as an aberration consequent upon Victorian imperialist euphoria. He seeks an opportunity of bringing the study of mankind, past and present, into an organic whole. He is arguing for a conception of history which will treat of all phenomena of man in society in their interconnectedness. History, like the world it studies, will once more became 'a seamless web'.

This is an attitude to the past which accords with the attitudes of most students of present society. It is, of course, by no means a novel attitude. What is significant about it is that, over the whole range of the study of society both contemporary and historical, there is a prospect of a consensus as to basic terms of reference. And not only in the limited sense of methodology but, perhaps more important, in the sense of generally accepted assumptions and values as to where the emphasis of study and teaching should be directed.

We have a glimpse of this prospect in Deane and Cole's book *British Economic Growth, 1688–1959*. Nothing could be more obviously relevant to the present situation, not only in Britain but in the world as a whole, than the problem of the causes and indeed the very nature of economic growth. Now historians are tackling the problem; and it is right and proper that they should do so for the historical dimension, the scrutiny of the process as well as the product, is essential to the understanding of any phenomenon. Even in this small instance our

* Norman Cohn, *The Pursuit of the Millennium*, revised edn, (London, 1963) and *Warrant for Genocide*, (London, 1967).

conception of the nature of this contemporary problem is altered when we discover, as Deane and Cole reveal to us, that over a period of three hundred years the annual rate of growth of real incomes has never exceeded 3.5 per cent and this rate was attained for only relatively brief periods in the nineteenth century.

It has been suggested by at least one leading historian in this country that economic growth might become 'the organising principle' of historical study. Compelling arguments can be marshalled in favour of this idea for it reaches far beyond economics as such: it is, for example, a concept which has been used to good effect in demographic studies. This should not be taken to mean, however, that economic growth should become the sole pre-occupation of historians and social scientists and it would be a distortion of the new history to suggest that it implies anything so narrow and, indeed, naïve.

The closer approximation of history and social science in the kinds of problem they scrutinise and the methods they use has led some, historians as well as sociologists, to question whether it is any longer justifiable to attempt to distinguish what are after all no more than two aspects of the study of man in society. A vigorous controversy enlivens the academic scene at the moment with Professor Elton in his recent book *The Practice of History* sailing into action with full guns blazing on the side of the separatists. The case on the other side has been forcefully argued by S. W. F. Holloway of Leicester University and his conclusion is quite uncompromising. 'Historical research and sociological theorising are', he writes, 'inseparable. If either are to be worthwhile activities, they have to be combined: but they cannot be fruitfully combined unless the distinction as it at present exists is swept away. Sociologist and historian must become one.'*

Does this mean that history as a separate discipline or subject is coming to an end? And does it not reinforce the very tendency we have seen at work, with disturbing results in schools and colleges? Even if the prospect Mr Holloway paints were to be translated into reality that would not mean the demise of history, but in any case it is unlikely to happen in the forseeable future. At most we shall see a process whereby history becomes increasingly sociological and sociology increasingly historical in emphasis. And, as Dr E. H. Carr suggests,† history will gain rather than suffer from such a process.

I have tried to show in this article that in some fields of historical study this process is already taking place and that it is generating a renewed vigour in the historical world. I believe it is a tendency which teachers of history should welcome (always of course in a critical fashion appropriate to their discipline) and they should begin to think about its implications for the teaching of history and of the social sciences.

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* S. W. F. Holloway, 'History and Sociology: What History Is and What It Ought To Be', in W. H. Burston and D. Thompson (ed.) *Studies in the Nature and Teaching of History*, (London, 1967).

† E. H. Carr, *What is History*, (Pelican, Harmondsworth, 1964).

'Perhaps the greatest single obstacle to be overcome in attempting to arrive at a new approach to physics or any other science in the sixth form, is the feeling on the part of existing teachers that they are, and must remain, experts who know all the answers.'

Sixth Form Physics — a new approach

F. R. McKIM

The work of the Nuffield Foundation's Science Teaching Project has resulted in the terms 'Nuffield approach' and 'Nuffield method' passing into the science teacher's vocabulary. For example, an article in the School Science Review (1967, 166, *48*) discussing the Nuffield chemistry course states 'it is not *what* is taught that is so important in this scheme as the method and approach by which is it taught', while another on the physics course says, of the physics books, 'one of the first tasks of these books is to convince the reader that the Nuffield approach makes sense and is worth embarking on'. So far as any single phrase summarises what the Nuffield teams meant by the Nuffield approach, it could be the one used in the physics course, 'teaching for understanding'. This is expounded at some length in the *Physics Teachers' Guide I* and is echoed in the *Chemistry Introduction and Guide*, 'Teachers seek to encourage lively inquiry, understanding and an ability to interpret evidence. . . . Pupils should gain an understanding that lasts throughout their lives of what it means to approach a problem scientifically.'

Any acquaintance with the Nuffield courses in physics and chemistry will show that the aim of teaching for understanding affects all aspects of the course, the nature of pupil experiments, class demonstrations, class discussions, and the kind of examination which tests progress. However, in the debate which has followed publication of the original books, the 'Nuffield approach' has often been taken to indicate particularly the approach to experimental work, and as being in favour almost exclusively of pupil-investigation. For example, Dr Whitfield has written, 'The Nuffield teams clearly believe that the heuristic approach is the most effective method for inculcating the scientific attitude in children.' Also Mr Fowles writes in School Science Review (1968, 168, *49*) 'The (Nuffield chemistry) team have all along conveyed the idea that this method (of pupil-investigation) was the bedrock of their new teaching.'

The Problem at A-Level

Most teachers are agreed that the O-level courses of a few years ago were too stylised, and that consequently the shake-up produced by Nuffield is to be welcomed, although there is some disagreement as to what proportion of the course should be given over to 'pupil-investigation'-type experiments. But the general prestige of pupil-investigation

at O-level raises the question as to what should be the 'new' approach at A-level.

There seem to me to be three main arguments against the widespread adoption of pupil-discovery experiments in A-level courses. The first depends on the greater maturity of the sixth former than of the pre-O-level pupil. If a pupil is to discover, he must be unaware of the answer to his experiment until his own results indicate it. In an O-level course, particularly in the early stages, the artificiality of his discovery (because the teacher already knows the answer) does not seem to matter. At the sixth form stage the artificiality is all too obvious. Furthermore, a sixth former who is developing the right attitude to books will be likely to refer to them for the answer to his problem, if the answer can be found there and if his teacher refuses to give it.

Secondly, the experiments in A-level courses are inevitably going to involve more expensive apparatus than those at O-level. Now the cost of the O-level Nuffield courses, particularly in physics, is considerable. Any large scale adoption of the pupil-discovery principle must mean multiple numbers of bits of apparatus for key experiments, and the cost is likely to become prohibitive at A-level.

Thirdly, even the most enthusiastic advocates of a thorough-going heurism admit that the rate of progress of pupils is slower with pupil-discovery than with lecture-demonstrations. The slower progress, and the smaller factual knowledge at the end, has not mattered at O-level because it has been possible to drop considerable parts of the traditional syllabuses which were generally agreed to be dead wood. Most existing A-level syllabuses are not so full of dead wood, particularly since the modifications resulting from the SMA proposals of 1961. Consequently if an end-point somewhere near the present one must be reached after a two-year sixth form course, in order to be acceptable to centres of higher education, there could not be a full-scale adoption of pupil-discovery, even if it were otherwise desirable.

The question therefore remains as to what the 'new' approach to A-level experimental work should be if, as is suggested here, pupil-discovery is rejected. On the grounds of economics alone, the usual practice in undergraduate courses is to have practical work and lectures independent of one another. In sixth form terms this would suggest a kind of circus of experiments which pupils circulate round over a period of some weeks, while theoretical work in the general area covered by the experiments proceeds independently. The consequence is familiar to all undergraduates. Some pupils do a particular experiment too early, when the background work has not been covered and consequently with pretty explicit instructions about what to do; others do it too late, when the result is already known. Almost the only point in doing experimental work under these terms is in order to learn certain techniques and to become familiar with new bits of apparatus. For the majority, the experiments are certainly not pupil-discovery.

It seems to me that except in comparatively few places, where cheap apparatus can be available in quantity, or where several different experiments all explore the same phenomenon so that each experiment can be done simultaneously by someone in the class, the pupil-discovery kind of activity cannot form the basis of sixth form work. If the sixth form course is to remain experimentally based, then this must be mainly through the lecture-demonstration.

Group Teaching

In the discussions over the past few years about teaching methods it has been customary to be critical of 'chalk and talk' methods. The reasons for this seem to have been twofold; the chalk has suggested a description of rather than a direct confrontation with the apparatus; and the talk has suggested teacher involvement and not pupil involvement. In advocating the lecture-demonstration I am not re-introducing these two suggestions. It is vital to have an actual piece of equipment for making measurements, and not just a diagram or a photograph of one, in as many cases as possible. It is equally vital for the pupils to get involved, but it is possible for this to happen without the necessity of individual experimenting.

Recently at Marlborough College we have changed over to an *mks* approach to electromagnetism. At the time of doing this we decided, for various reasons, to adopt a system of group teaching. During a double period (1½ hours), for the first three quarters of an hour or so three or four sets are combined for a lecture-demonstration. Then for the remainder of the time the pupils break up into their smaller groups with their own setmaster. This has led to a more efficient use of teachers' time, in that good demonstrations have been set up only once, instead of three or four times. When planning a lecture-demonstration for a large group it has been important to make everything readily visible to all members of the audience. Large scale demonstration meters have helped and in several instances the use of a closed-circuit television system has proved invaluable.

This method of teaching showed us that there can be considerable pupil involvement, without necessarily any direct taking of measurements. Often in the lecture-demonstration with the apparatus previously adjusted the principle of measurement has been demonstrated, and then a series of readings taken in a comparatively short time. An alternative technique is to take only a sample one or two before distributing the results of more extensive measurements to the class. In either case the pupils are able to participate, in working out results, assessing data, suggesting further experiments and so on, almost as effectively as if they had taken the original measurements themselves.

If the argument which I have developed here is accepted, then the majority of the sixth form courses of the future will consist of lecture-demonstrations, with a few pupil-discovery experiments but with most of the pupil experiments of the technique learning or apparatus familiarisation type. However, a course consisting just of this would be seriously deficient in two respects.

First, apparatus which has been developed specially for school use is purpose-built and designed to be trouble free. It gives (or at least is intended to give) no hint of the difficulty of real scientific research. An example of this is the apparatus for determining the charge on the electron, after Millikan. The intention in the ASE report *The Teaching of Modern Physics* was that this should be a straightforward pupil experiment, with pupils able to deduce the charge on one or two drops in a double period. In the early days of the Nuffield physical science trials it was clear that this intention was unfulfilled. Whatever manufacturers claimed, or skilled teachers could achieve, average pupils (and many teachers) were unable to get any meaningful results in a reasonable time. The reaction to this situation has been to fall back on a film

of the experiment being conducted, either the PSSC one or a new Rank-Mullard one. As a means of conveying the essence of the Millikan experiment these are unexceptionable, and with the appropriate introduction they may well be the best means of teaching this particular bit of work. But the lesson is no longer taught that experimental work is much more difficult than the textbooks or the well-prepared lecture-demonstration suggest.

There is yet another reason for wanting to add to the course content outlined above. Schools will possess only one or two bits of apparatus with which experiments can be conducted to determine, say, the electronic charge. In a class discussion of this topic a teacher may invite suggestions from pupils as to how they might set about such an experiment, starting from scratch. Yet in practice the teacher will know of the existence of the particular apparatus possessed by the school and will clearly encourage its use, whether the pupils actually suggest it or not. This is, of course, not always bad. And if any sixth form course is to cover a reasonable amount of ground in two years, some considerable amount of ready-made apparatus must be used. However, from the point of view of educating pupils in the real nature of scientific activity, rather than giving them an understanding of how certain results are arrived at, it is clearly desirable that they should at some stage be asked to design and build some piece of apparatus for themselves.

It was for these reasons that the Nuffield physical science team introduced a project as part of the course, so that a pupil should have some experience of doing an extended piece of experimental work in science. By this means not only are pupils often given the new opportunity of designing and building a piece of apparatus, but also they engage in pupil-discovery without any of the disadvantages mentioned earlier if the topic covered is an integral part of the course. Furthermore, the designing and building gives the pupils a freedom for self-expression in their personal activity which is unique in a science course. Some work done on boys' attitudes towards science at Marlborough College suggest that the lack of freedom in science courses compared with arts courses is one of their notable features, in the absence of any kind of project work. There was general agreement among all the teachers of the first pupils in Nuffield physical science, who took A-level this past summer, that the project was a significant and beneficial part of the course.

Content of the Course.

In addition to the question of method and approach in the sixth form science courses of the future, there is also the question of course content. The advent of 'physical science' prompts the question as to whether the traditional labelling 'physics', 'chemistry' and 'biology' will, or should, remain.

There are various factors to be taken into account here. There is, first, the higher educational training and past teaching experience of the existing teachers, which is in the main along the lines suggested by the traditional labels. If teacher training is regarded as primarily a familiarisation with subject matter which is subsequently to be taught, then the present expertise of teachers is an argument in favour of the *status quo*.

What is the purpose of a sixth form course in physics or any other science? In spite of the unequivocal dictum of the Crowther report:

'the acquisition of factual knowledge is by itself a poor test of any education, and a lamentably poor test of the education of boys and girls of 17 and 18', A-level examination papers in science continued to leave little doubt that the examiners regarded the acquisition of knowledge as of primary importance. The recent increasing emphasis on comprehension and application of knowledge is most welcome. Regurgitating fact is not as important as thinking scientifically. Consequently the question arises as to whether the present grouping of the factual material of sixth form science is the only or even the best grouping.

In the BBC radio series on *Growing points in physics* in 1967, Professor Frisch pointed out that the boundaries between physics, chemistry and biology are getting increasingly blurred at the research level, with the flourishing of physical chemistry, biochemistry, and biophysics. More recently the Dainton Report has made the same point. There seems little doubt that in the future the concepts and techniques of physics will be increasingly applied in the other sciences, so that the traditional divisions will be progressively harder to retain. Furthermore, it may well be that the direction of growth in pure physics is going to be determined by economic considerations. High energy particle physics, like astronautics, may soon become a luxury that can barely be afforded. The world's resources are not unlimited

Some teachers will probably feel that what happens at the research level should not determine what a subject looks like at school. Others will feel equally strongly that it should. This was, after all, the reason for wanting to include some twentieth century physics in the SMA course of 1961, a move which came from teachers. While the concepts which are considered basic seem likely to remain so, their importance may alter and their emphasis in future courses may correspondingly change. Consequently what is happening in science at the research level is, I hope, going to have its effect in teaching courses not only at university but also at school level.

In addition to this there is on the part of sixth formers an increasing demand that their studies should have relevance to the world outside. If they read about transistors or lasers in such places as *Science Journal*, they want to know about them in their physics courses. And the classic retort 'You must learn the basic grammar of the subject first' is quite inadequate—and merely shows our insular and academic approach to language. The experience of recent years seems to suggest that several topics which some held to be impossible to introduce in school syllabuses can be added successfully, provided that enough thought is given to their method of presentation. Of course pupils do ultimately have the most powerful of all influences, in their choice of subjects. It is useless for teachers to provide what they consider the ideal course in physics or any other subject, if pupils refuse to choose it. And with the present swing from science, pupils' attitudes cannot be ignored. It is interesting that of last summer's first entry of A-level physical science candidates, 36 per cent were in addition taking mathematics and biology and 18 per cent were taking mathematics and an arts subject, an indication of a significant desire to move out of the strait-jacket of the traditional subject grouping by intending future scientists.

Another re-grouping of subjects being canvassed at present is a single A-level in mathematics-with-physics. This is designed primarily for the

future biologist, who needs some mathematics (and for whom the choice of mathematics, physical science, biology is too difficult, unattractive or not available). The idea has the merit that it can be more readily taught by some existing teachers than can physical science. It has the disadvantage that the impression is pretty explicitly made that physics is the main area where mathematics finds application; an impression that many mathematicians dislike. An even more serious objection is that its introduction would do nothing to postpone career choices beyond the beginning of the sixth form course, whereas one might hope than any re-grouping of subjects would enable some decisions to be deferred beyond the O-level stage—as would the introduction of physical science.

However, in the background of any possible subject re-grouping is the question mark about the whole future pattern of the sixth form curriculum. With a multiplicity of suggestions, from the Schools Council's 'two A-levels plus electives', to the Dainton four or five subjects one of which must be mathematics, some fairly radical re-thinking is possible. From the scientific point of view, I hope this does result in a moving together of the various schools sciences, so that school children might no longer find it strange that the laws of mechanics apply to moving animals, that biologists use and understand oscilloscopes, that chemical reactions behave in the same way in the gut as in a test tube, and that an active brain produces measureable voltages outside the skull.

Perhaps the greatest single obstacle to be overcome, in attempting to arrive at a 'new approach' to physics or any other science in the sixth form, is the feeling on the part of existing teachers that they are, and must remain, experts who know all the answers. This problem did not arise in the lower school. The Dainton Report pointed out that a large amount of teaching at the lower levels is done by non-experts anyway. They are quite ready to be told how to alter their teaching. But in the sixth form things are different; and if a teacher is expert in a particular syllabus it takes a considerable confidence in his ability before he will readily accept the possibility of radical change. What if the physics teacher has to teach science and be asked questions about chemical kinetics to which he does not know the answer (although his chemistry colleague does)? Or what if the project throws up questions to which no one at school knows the answer? The change from the situation in which there are right answers to everything, and in which the teachers knows them all, can be rather startling.

Professor Popper has expressed the situation in this way. 'The wrong view of science betrays itself in the craving to be right; for it is not his *possession* of knowledge, of irrefutable truth that makes the man of science, but his persistent and recklessly critical *quest* for truth. That quotation could profitably be inscribed on a good few walls up and down the country. If it were really accepted that one of the principal aims of the sixth form science courses was to enable pupils to understand, be excited by and begin on a 'quest', then there would not only be a 'new approach' but perhaps also a change in direction of the much-discussed 'swing' from science.

This article describes experiments in the curriculum by one school sixth form.

General Studies in School

T. W. TAYLOR

The following is a brief account of some experiments in the curriculum of the Haberdashers' Aske's School, Elstree. The purpose of these experiments, carried out over a period of 22 years, has been to provide a balanced education at all stages of the school course. In the past, too many schools have begun to specialise too early—presumably in the belief that study in depth is more important than study in breadth. This may have been done by allocating pupils to classical modern or science sides as soon as they were admitted to the school, or by the kind of time-table that gave to the science sixth, for instance, thirty-three periods a week of mathematics, physics and chemistry, one period of religious instruction and one period of physical education.

Since 1946 such extreme specialisation has gradually become unfashionable. More and more schools have developed a broader curriculum throughout the course and have curbed any tendency to undue specialisation in the sixth form. The trend manifested itself in the General Studies Association and in the agreement to broaden the curriculum, under which many schools undertook to devote at least one third of the sixth form time to general education.

From my experience of schools in this country, in Europe and in the USA, I am convinced that the pattern of education should be broadly based, not only at the primary stage but also throughout the secondary stage. I am equally convinced that a limited amount of specialisation is desirable at the sixth form level—at any rate for those students who expect to proceed to a university; for them study in depth is appropriate in the subjects in which they are specially interested—provided that they spend at least one-third of their time on general studies.

It follows that programmes of general and specialist studies in the sixth forms will depend for their success upon the foundations which have been laid in earlier years. I feel strongly that schools should not be divided into sides below the sixth form level. Even in the sixth form there should be no hard and fast divisions and it should be possible for students to choose from a wide variety of advanced level subjects and at the same time to continue their general education.

At this school all boys follow a common curriculum for the first four years of the secondary course (40 periods a week). For the first two years the period allocation is as follows: English 5, history 2, geography 2, French 4, German or Latin or Spanish 4, mathematics 5, biology 2, chemistry 2, physics 2, art 2, handicraft 2, music 2, religious instruction 1, gymnastics 1, swimming 1 and games 3.

In the third and fourth years, in order to provide additional time for science (biology 3, chemistry 3, physics 3), all boys have general music (1) and 2 periods for art or handicraft or special music or a technical project. There are also opportunities for taking such practical subjects

outside the curriculum; for example some boys continue with art or handicraft outside school hours and more than one third of the pupils learn musical instruments, either individually or in small groups.

In the fifth year all boys take seven courses, each for four or five periods a week; English, a foreign language, mathematics and four chosen from the other subjects previously studied i.e. history, geography, a second language, biology, chemistry, physics, art, handicraft, music or religious knowledge.

In the sixth forms, most students choose three advanced level subjects (each for eight periods a week), a subsidiary subject (four periods a week), general studies (six periods a week), in addition to religious instruction and physical education.

The present curriculum provides a broadly based course throughout the school. In addition to six weekly periods of religious instruction and physical education our boys devote the remaining 34 weekly periods to twelve subjects in the first two years, to ten subjects in the third and fourth years, to seven courses in the fifth year—and in the sixth forms to three advanced level subjects, a subsidiary subject and general studies. The fact that the number of our students proceeding to higher education has risen to 90 per cent during the last twenty years is an indication that the universities value the broadly based education which the students have received at this school.

The present curriculum has evolved by stages, the first of which in 1946 was to require sixth form boys to choose a subsidiary subject in addition to the three which most were then studying for the old higher certificate examination. The science sixth was expected to choose an arts subject and the arts sixth a science subject.

After 1950, when the former school and higher school certificate examination was superseded by the new general certificate of education examination, one subsidiary subject with a time allowance of three periods a week was considered inadequate to combat the growing emphasis on the specialist subjects. A new scheme of general studies therefore was carefully planned and introduced into all the sixth forms. At first two periods a week were allocated to general studies in addition to the three subsidiary periods. In 1961, when the school moved from Hampstead to Elstree, a forty-period week was adopted; four periods each of forty minutes were allocated to the subsidiary subject and four to the general studies. In 1962 the general studies allowance was increased to six periods a week, including preparation for the *Use of English* paper and a proper introduction to the choice of a career.

During the general studies period all of the sixth forms are simultaneously divided into groups of approximately fifteen students. In the earlier years all the groups consisted of arts and science students mixed and each group was supervised by one master for a whole year. All groups followed the same general plan and the masters who volunteered to take them were drawn from all departments of the school. Later experiments were made with a termly rotation of masters in some groups and sometimes in the third-year groups the arts and science students were segregated so that they could follow a plan of general studies appropriate to their specialist subjects. For example, the science specialists require more English—and a different kind of

English—than those who are already specialising in English. Similarly the arts students require a different approach to science in their general studies, as compared with those who are already specializing in science.

Over the years almost every possible permutation has been tried in the administrative arrangements for the general studies programme. At one stage it was considered best to have groups of similar intellectual ability drawn from both the arts and science sides. In recent years the groups have been of mixed ability and have studied two topics, each for half a year, with three masters allocated to each topic—each master taking a group for half a term. In some topics the three groups have been combined for general lectures by one of the masters or students—and also for visits to places of interest relevant to the topic. For the latter purpose two of the general studies periods have been time-tabled for Monday afternoons so that the groups can leave school for these visits. The programmes for the second year sixths are similar except that the groups are normally shared by two masters for half a year each.

More important than the administrative form of the general studies programme is the content of the general studies curriculum. Here again many experiments have been tried. In the early days all groups in each year, although supervised by masters from different departments, followed a general syllabus which included a wide variety of topics from the aesthetic, social and scientific fields of human knowledge, usually with prescribed books which all groups were expected to read. All groups studied some aspect of such topics as art, music, literature, history, economics, psychology, religion, politics, mathematics, science—so that theoretically no boy left the sixth form without some knowledge of the leading personalities in the many fields of human activity and knowledge.

The current contribution of the different departments is as follows:

English	The Use of English, Modern Drama, Modern Literature, American Literature.
History	American History, The First World War, The Russian Revolution, Modern China, International Communism.
Geography	World Population and Food, (with special reference to the developing countries).
Economics	Political Theory, Sociology and Statistics.
Languages	The Sociology of Languages, (with special reference to propaganda and the problems of international communication).
Science	The Scientific Method, Psychology, the History and Philosophy of Science, Anthropology, Photography, the Recreation of Historical Experiments.
Art	Art Appreciation
Music	Some aspects of the History of Music.

In 1967 with the help of Harrow College of Technology, several groups followed a ten week course about industrial methods and management. Lectures were given by a variety of speakers from the various industries representing management, the Ministry of Labour, trade unions, etc., and visits were arranged.

The latest development has been the introduction of courses in technical design e.g., designing a wind tunnel with the assistance of the science staff and constructing it under the supervision of the handicraft staff. This innovation has proved very popular and similar experiments have been arranged for the third and fourth forms in the middle school.

In addition to the regular courses, a few general lectures by outside speakers are arranged for each term, usually on connected topics. For example, in 1967 a series of lectures was given by a psychologist and outside visits were arranged to a local mental hospital. In 1968, in association with the School of Oriental and African Studies, a series of general lectures was given about the developing countries.

The following is a summary of the general studies course in operation for the academic year 1968-1969:

Lower sixth students choose two of the following courses, each lasting for half a year:

1. Classical Art and Literature
2. Examination of the developing countries and the comparison of their problems with the United States of America.
3. A science course including some practical work in biology, chemistry and physics.

Upper sixth students choose one of the following courses:

1. Technical design and psychology—each for half a year.
2. Or a half year course each on two of the following:—
   (a) The welfare state, with special reference to education, health and social security.
   (b) The impact of industrialisation and urbanisation in England since 1800, not only on economics and politics, but also on art, literature and music.
   (c) Future world problems, with special reference to communication in the space age and the development of 'super-human' beings with the aid of medical science.

During the last twenty years more than a thousand different general studies courses have been held and it will therefore be appreciated that the current list is a very small example of what has been achieved. The courses are studied in depth and the students are deliberately encouraged to digress from the current topic into adjacent fields of learning. All the members of each group are required to produce some written work either in a series of essays or a small thesis—or give a lecture to the whole group.

As far as staff and facilities allow, the students have a free choice of their general studies courses. They are invited to submit reports about courses they have followed and to make suggestions for new courses.

The number of students who continue with full-time further education has risen to 90 per cent—70 per cent going to universities and 20 per cent to colleges of technology, training colleges, etc. It is clear that the increase is due not only to success in the various specialist subjects but also to the good use of the minority time in general studies and subsidiary subjects.

Birmingham has the largest number of non-European immigrants of any city in Britain other than London. This article describes the work the City's LEA is doing.

The Education of Immigrants

W. M. DUTTON

The word 'Immigrant' is always good for a headline, for all that no acceptable abbreviation has been coined. Any city with a large number of coloured residents from the Commonwealth or elsewhere can be forgiven for being a little sensitive to news items on the subject. Although it is recognised that as far as the Press is concerned a great deal of well-informed and thoughtful comment may lie under the headline, it is not unfair to say that 'Crisis' very frequently keeps it company. There are many books for study of the subject in depth but the purely educational issues are often difficult to identify among the general treatment of the theme. The purpose of this article is to describe the situation as it has affected the schools of an area with a high concentration of immigrants where the situation is new in a way it is not new in Glasgow or Liverpool, without concerning itself with the admittedly more fundamental questions of integration and colour as such.

The Birmingham Education Authority has responsibility for the largest number of non-European immigrants of any authority outside London. It does not have the highest percentage. It is in fact sixth, with 9.6 per cent in primary and 8.0 per cent in secondary schools. The reason for this of course is that Birmingham is a very large city. Within its boundaries therefore can be found in microcosm the same situation as over the country as a whole. Some parts of the city have almost no resident immigrants, some are approaching the reverse. Naturally it is in these latter areas that the schools are to be found with the highest percentage of immigrants. The use of the word 'naturally' is, like almost any statement on this subject, open to challenge, but the question on dispersal is too complicated to be discussed here. The Director of Education for Bradford, until recently an officer in Birmingham, said in December that dispersal in Bradford can be managed, but that no policy could be recommended as universally applicable, bearing in mind that the size of an area might involve long journeys to school. The total maintained school population is 184,670. Excluding special schools the overall percentage of immigrants officially designated is eight. The reason for the qualification to the statement is the result of a definition of terms. The official returns to the Department of Education and Science are required to exclude children under the 'ten-year rule' which, broadly speaking, excludes children born and brought up in this country by parents resident for ten years or more.

Unwillingness to concede that children born and brought up in Birmingham are more than partly 'naturalised' results in a much larger figure of immigrants in Birmingham. It would be contended that their

home environment is still so much a native and not an English one that both knowledge of English and what one headmaster terms 'socialisation' are incomplete. Though some are born and bred as 'brummies' and speak accordingly, it is impossible to suggest any period of residence which would be an acceptable compromise, or to attempt any assessment of the amount by which the two divergent figures could be brought nearer together. The difference in 1968 was already over 3,500 and a projection of the figures shows a growing divergence, a matter which may well have great importance when the percentage of immigrants in a school or an area is a factor in deciding the help to be given under such schemes as the current educational priority areas and the urban aid programmes. The implied recognition in these and other measures that the problems are national and not purely local has been greeted with relief, though the figure of Oliver Twist would have to be included in a tableau of the scene.

From the administrative point of view of course a great deal depends on the identification of the problem and its size. It is interesting that Birmingham began to keep its own statistical records of immigrants in schools in 1962 whereas national returns were not asked for until 1966. Before 1961 even the census returns gave no clear warning. Less than a decade ago therefore it was a cloud no bigger than a man's hand. A photograph taken in 1958 of the top classes in the primary school which now tops the league table has no coloured faces in it at all and lower down the school there were a mere half-dozen or so. There were immigrants in Birmingham before 1958. As early as 1950/1 the Clifton Institute was set up to cater for coloured people. But this was an evening institute and the immigrants who benefited were of African and West Indian stock. The history of this institute however belongs to the field of further education and merges into the other provisions for adults in other institutes and colleges. At the other end of the age range the Sparkbrook Association, founded in 1960, in addition to general social work, soon began to cater for the under fives in a play centre. For this it received financial support from the authority, and other voluntary bodies have since sought to provide facilities of this kind. One of the most recent was founded and privately financed in memory of the BBC producer David Gretton who amongst other programmes was responsible for the *Look, Listen and Speak* English teaching sessions on television.

At the 1961 census there were 27,000 non-European immigrants in the city. There were just over 3,500 of their children in the authority's schools when the first full count was taken in 1962. In January 1968 there were nearly three times as many, using the Department of Education and Science definition of immigrant and many more if the ten-year rule is not applied. Like all comparisons of this kind, this one should be approached with caution because in 1962 the Department of Education and Science definition had not been arrived at.

The time scale is therefore quite astonishingly small. When it was realised that this was not a problem on which action could be deferred, as for example with the raising of the school leaving age, how did the teachers, the schools and the LEA react?

What made action imperative was the increasing proportion in a number of schools of children who could not speak or understand English. In 1960 the department for the teaching of English as a second language

was formally set up. It consisted of two peripatetic teachers one of whom was put in charge of the department a year later. Quite soon the team, whose time had to be spread thinly among a number of schools, was supplemented by the creation of separate classes with their own teachers in the schools most affected. There are now nine of these classes in primary and eleven in secondary schools. But Birmingham has come to rely increasingly on the work done by the special team.

They number 65 full-time and three part-time teachers who visit 79 schools and teach groups involving a total of about 2,300 children who are withdrawn from their normal classes for periods of concentrated direct method language teaching. They now operate from a base near the centre of the city in a building formerly used as an annexe to a primary school. It has an eight-booth language laboratory, a large room for the display and testing of audio-visual language teaching materials and of books, a room for meetings and classes, a small secretariat and a workshop. It was soon realised that there was a clear link between this work and the developments in the teaching of foreign languages and this link is being exploited. It is already possible, after 12 months, to regard it as a language centre. Not merely do the 'peripatetic' team meet here regularly each week, but teachers who seek advice or facilities for the examination, testing or creation of teaching materials can find them here. Amongst its other services the centre is able to provide schools with interpreter help and with letters to parents in Punjabi, Gujerati, Urdu, Bengali and Hindi. It is natural that meetings of the area branch of the Association of Teachers of English to pupils from overseas (ATEPO) should often be held here, and teachers and administrators from all over the country often make this the starting point of visits of inquiry. The LEA is extremely generous in the help and information from its experience that it is willing to give, largely through the teacher in charge of the department (the head of the centre) and his assistants. Of particular interest is the attempt to meet the needs of teachers, whether from primary or secondary schools, who are not specialists, but have a number of non-English speakers in their classes. Not all the children in need of special help with English before they can profitably take part in the normal instruction in all subjects can receive help from a member of the team and even those receiving help can only do so for a part of the day or the week. For a long time too, it had been assumed that enough English would rub off in the normal infant school activities to make special help there unnecessary. This is no longer taken for granted, partly because a school may have enough speakers with a common tongue other than English for them to tend to play and talk together in their own language and partly because—and this applies equally all up the age-range—no English is spoken at home. Members of the special team therefore now include eleven infant schools in their visits.

It follows that a great many non-specialist teachers are involved and a series of in-service courses is held at the centre. It is in fact these teachers who are hardest pressed, and the most effective way of helping them has yet to be found. To the skills of language teaching it is most useful to add a knowledge of the home background in India, Pakistan or the Caribbean. Part of the answer lies with the colleges and institutes of education and a beginning has been made in this direction.

The centre is not used a great deal for the teaching of the children

themselves, a pity perhaps in view of the admirable facilities available. Useful though it is, the schools do not rely entirely on the centre. Many have accumulated a great deal of teaching material and expertise themselves and some have a special room which may be equipped with a tape-recorder with multiple headphones connections, and Birmingham is one of the areas in which the new material for the Schools Council Development Project has been tried out; indeed many of its items reflect the methods already devised in Birmingham.

Other centres which are used for actual language teaching are for children of secondary school age. They were hurriedly started in makeshift accommodation when the number of children with no English was quite suddenly found to be creating a problem in secondary schools only about two years ago. There are three centres of this kind now better housed in premises built for school use. Entry is linked with medical examination and registration and the pupils follow a programme which is no longer one of undiluted instruction in English. Two terms may be spent here before a normal secondary school is asked to accept them and at the end of 1968, 47 secondary schools were in fact receiving children from the centres. No one seeing them at work can doubt the eager acceptance by parents and pupils of what is offered. A recent development has been the enrolment of girls as well as boys, and girls now amount to a quarter of the 200 children at the centres. It is at once touching and almost frightening to watch a group of young Indians and Pakistanis, some of them with fine sets of whiskers which cast doubt on their 'official' age, playing childish games culled from infant teaching methods for the sake of the skill which will open the door to employment. The spirit and morale of these centres is very high indeed. Another development at secondary stage, for those who spend long enough in school to have a reasonably desire for a paper qualification—and yet are unable to face an examination paper in English set for English children—came when the West Midlands Examination Board pioneered the CSE English for Immigrants paper. The results after one year were sufficiently encouraging for the scheme to be continued in 1967-8 and it may have come to stay, despite some obvious reservations about its status and equivalent value. Some 300 entries are expected for the 1969 examination. When it comes to deciding eligibility the onus lies on the head teacher of the school attended.

No one pretends that non-English speakers are no longer a problem, but at least this part of the picture is fairly clear and administrative steps taken with vigour and enterprise have met with a very large measure of success.

Unhappily however, this is not the whole picture because there are roughly twice as many children of Caribbean origin in the schools as there are children of Asiatic descent. It has come to be recognised too that children from the West Indies bring their own linguistic problems. It is hoped that current research at the university and by a local working party may produce practical advice, though the work has been largely confined so far to the identification of the differences of vocabulary, pronunciation and sentence structure.

West Indians and Asiatics alike are on the whole concentrated in two areas of three and two square miles. As far as the schools were concerned the children were just there and the teachers got on with the

job. The cultural and emotional shock of a sudden transference from an Indian village or a Caribbean island to a huge industrial city is a familiar theme. The difficulties are obvious, ranging from elementary social and toilet habits to more profound differences of outlook between home and school. Many of the difficulties are the result of living conditions and environment and can apply to white and coloured children alike. Where the two sets of problems overlap, any measures taken to alleviate distress mingle in a general attack on social deprivation. Under these circumstances a head teacher's time may be as much taken up with general social welfare work as with running a school in the ordinary sense. Supplementing the elements in any urban relief programme which incidentally or by design help the immigrant community, the LEA has done a great deal for immigrant schools. Staffing is as generous as may be in an area which has long had a teacher shortage; the teacher quota is increased by 182 for this purpose. Non-teaching helpers in primary schools have been raised in number to 300 and some schools have as many as five or six. The clerical assistance allowance and the capitation allowance are higher and additional midday supervisory assistants are provided on a scale applying to all schools with more than 20 immigrant children.

All the measures taken, whether for non-English speakers or for all immigrants alike, are expensive. Those affecting teachers, auxiliary helpers and work done by welfare officers alone cost over a quarter of a million pounds in 1968-9.

But when all this has been said, many basic questions remain. The longer the present situation persists, and in making any fundamental changes the education authority is only one of the many agencies concerned, the more likely it is that further problems will arise. One major problem already causing concern is that nearly all the effort in the schools has of necessity been directed mainly to newcomers to the country, whatever their age. Essential though it has been to treat this as a first priority it is increasingly recognized that it can do little more than get the immigrant off the launching pad and into the school orbit. "booster" treatment is needed to help the young immigrant to realise his full potential and to obtain a place in school, further education or employment commensurate with innate ability but masked and hindered by inadequate command of language. Diagnostic tests for this stage are far from perfect, and neither teaching materials nor methods have been developed to meet the situation. A further complication is that English for immigrants merges quickly at this point into the teaching of English in general, a field in which changes of great importance are taking place as part of curriculum developments in secondary schools. Complete success cannot in any case be hoped for within the first generation. Yet it is in this area that the next step in the education of immigrants may be looked for.

During May 1968 the author visited New York, Washington and Pittsburg, to study the effectiveness of the US Federal programme of compensatory education.

The Disadvantaged Child
—a report from the U.S.A.

L. J. BURROWS

The extremes of affluence and poverty are greater in the USA than in Britain; so, too, are the variations in educational provision. The devolution of the American educational system has meant that wealthy communities have been able to afford good school systems and poor ones have not. In the southern states this contrast was aggravated until recent years by the maintenance of two parallel school systems, for white and coloured children respectively; expenditure per pupil was far lower in the coloured than in the white schools and the former therefore became as a whole an educationally under-privileged class. In the large cities of the north there was no such overt discrimination, but the same concentrations of poverty and poor schools in inner city areas grew up as are well-known in England.

Since the last war, and especially in the last ten years, large-scale migration of disenchanted Negro families from the southern states into the great cities of the north has sharply accentuated all the problems. The Negroes moved in the expectation of finding better housing, employment and education than in the south; but the sheer weight of their numbers, apart from economic factors, has led to the frequent disappointment of these expectations, to subsequent resentment and, in recent summers, to civil disturbances. The whole structure of city life has changed in consequence. White families, alarmed at the influx and anxious in particular for their own children's education (one official after another assured me that fear of declining standards was the major factor) uprooted themselves and moved in great numbers to suburbs or countryside, thus increasing the financial resources of these well-provided communities and leaving largely impoverished communities in the city centres. The result is that in Washington to-day 94 per cent of the children in the public schools are coloured; the pupils in fee-paying private and parochial schools, on the other hand, are almost entirely white. In New York 50 per cent of the public school population is coloured, and this figure is expected within five years to rise to 70 per cent. Every major northern city, except perhaps in the far west, now faces a similarly developing situation. Poverty and colour have thus become closely linked in the cities, though not necessarily elsewhere. The social and political consequences of the now predictable Negro domination of the major cities, and the racial cleavage inherent in such a situation, are undoubtedly in the minds of leading American educators, who believe that education must try to break this vicious spiral and reverse the white exodus by providing the best, instead of the worst, education in the city centres. The educational task is seen as just this—to supplant the worst by the best; thus a huge drive to improve educational opportunity for the 'disadvantaged' has been launched.

Organisation Projects

The Federal Office of Education has an appropriation for the current year of one billion dollars for 'compensatory education'. It makes these funds available for approved purposes through its own Division of Compensatory Education to those of the 22,000 boards of education which apply and qualify. The initiative, formally at least, is with the local boards which propose, organise and administer the projects once they are approved; often working in conjunction with teachers' colleges or the research departments of universities. Projects are approved individually and the use of these funds is restricted to them; local boards do not receive block grants to be used at their own discretion, though the detailed planning of the individual projects may be largely left to them. A project may involve a whole school, a group of schools or a single course within one or more schools; it is therefore not uncommon to find some classes or courses in a school enjoying, for the purposes of the project, staffing, equipment and facilities on a far more generous scale than does the rest of the school. This feature illustrates the experimental nature of many of the compensatory projects and this seems to be accepted without demur by staffs. The major emphasis is on experiments in curriculum, methods and staffing, and in some ways resembles the working policies of our own Schools Council; but the scale, in comparison, is vast.

The pattern in the three cities I visited is considered effective and, I was told, is probably repeated elsewhere. A senior officer of the city board of education is placed in charge of a newly created division of compensatory education, with assistants who specialise in different aspects such as curriculum, training, staffing, equipment, budgeting and administration. An over-all plan is worked out for the city and suggestions for projects are invited from anyone in the education service; local teachers' colleges and foundations are also brought into consultation. Project directors are appointed, mainly from the ranks of supervisors, school principals and experienced teachers. Theirs is the detailed task, in co-operation with other members of the division as necessary, of assigning the project to particular schools, selecting staff (teachers and ancillaries), leading training courses, arranging the supply of equipment and apparatus, keeping contact with members throughout the period of the project, presiding at the weekly conference of team leaders from the various schools, evaluating progress (by more detailed objective means than we usually employ) and producing reports. Though the programmes are compiled annually, it is recognised that most of the projects will have to run for three years or more to enable reliable conclusions to be formed.

Within the school, team-work is the keynote. Principals take a close interest, but may not make changes in the operation of a project without the express sanction of the project director. In some, he acts in effect as visiting team leader; but in the larger projects, a suitable teacher is appointed team leader within the school. Daily staff contacts and weekly conferences, with readiness to keep the programmes flexible, were features in all the schools which I visited; the other feature that was universally impressive was the scale of staffing, frequently twice as generous as the normal.

Comparison with the UK.

The differences between American practice and our own are of course

considerable. The most striking is the scale of the US effort in compensatory education, maintained and expanded as a national priority even despite the financial drain of the Vietnam war. Is the need comparable in this country? In many ways it is not. One powerful safeguard in England has been the central control of education, which has ensured certain national minima of staffing, training, building, equipment and educational performance. A second safeguard has been that we are almost certainly well ahead in teacher training (the academic and unpractical nature of which, in the United States, was trenchantly criticised by many of the officers and teachers whom I met), and in several aspects of curriculum development. The admiration of many Americans for the Crowther, Newsom and Plowden reports and for the objective and authoritative guide-lines which they have laid down for future advance was very striking.

Nevertheless, we have too many of the ingredients of the American social powder keg to be complacent about our Education Priority Areas (EPAs). The parallels between the American inner city areas and some of our own are clear enough. In both, the neighbourhoods are often depressing, the housing overcrowded, the schools old and poor. The sum total of educational opportunity is generally less in EPAs than in more favoured areas, even if the disparity is greater in America, The steady increase in the proportion of coloured immigrants, and the accelerating exodus of white families to the suburbs, presents an uncomfortable parallel to the American situation, and onw which could similarly become menacing if unemployment developed and our immigrant pupils left school inadequately qualified. It is true that we do not have the long hot summers which in America foster civil disturbance—but, in the words of the Director of Compensatory Education, who himself toured England in 1967: 'We've started too late: don't you make the same mistake!'

Our own aid to EPAs has so far taken the form of special building allocations, adjustment of teacher quotas and additional salary payments. The main American effort, in contrast, is on curricular programmes, many with a marked experimental content, ancillary personnel, material resources, and parental and community involvement. Under the auspices of the Schools Council, of local teachers' centres, and of experimentally-minded individual teachers, we are making good, and in some respects excellent, progress in the fields of curriculum and method generally, though little, if any, of this has been specifically directed towards the disadvantaged; but we are less good at effectively disseminating results and at improving the performance of our average teachers through ancillary help and better material resources.

The Federal Commissioner for Compensatory Education, Mr Howe, stated in a recent address:

> 'Let me mention a general principle that must inspire any programme for educational renewal addressed to our pressing problems. It is the principle of 'critical mass'. Borrowed from physics and translated into an educational context, this concept calls for a focus of all those human and material resources necessary to produce major educational improvement. It suggests that any amount of resources short of the critical mass will fail to produce measurable change. Perhaps more important, it implies that human and financial resources must zero in on a particular problem, not be dispersed

generally through every school in the uncertain hope of over-all improvement.'

This is a principle foreign to our traditional practice of spreading the available jam widely, and therefore thinly, in the name of fair sharing. The Plowden report challenged this with its plea for positive discrimination in favour of EPAs. What the American experience now says to us is that, to be effective, this must be concentrated and on a scale large enough to achieve 'critical mass'. To implement this would involve putting massive financial and other resources into compensatory education, and selecting centrally a few specific priorities in order to concentrate on them. The Government's 'urban renewal' programme accepts in principle the first decision, though whether it approaches the 'critical mass' required, only time will show; the second decision could quite naturally follow if we defined our priorities and sought exact means of carrying them out.

The Early Years

The belief is widespread that returns will be greatest from concentration on the 3-8 age groups. Here the most striking feature is the large number of 'para-professionals' who take part in all programmes and who relieve the teachers of a wide range of fringe duties; in addition these aides make contact with parents and the community, and in some cases undertake after-school activities with the children.

Details of the pre-primary programmes vary from city to city, but the following are representative features.

(i) *Admission of Pupils.* They are recruited through direct contact with homes, visits, pamphlets, etc.; para-professionals undertake this. The actual selection of children for the classes is then made by a committee which usually includes the principal of the school, teacher and community representatives, and the project co-ordinator. Criteria for admission are well-defined and are broadly those suggested by Plowden in its recommendations on the expansion of nursery education.

(ii) *Staffing.* In each class a qualified teacher, either one with appropriate experience or one who has been seconded to a special one-semester course; an aide, and part-time 'volunteers'. Pittsburgh supplements this provision with an itinerant staff of teachers and 'school community agents'. This itinerant staff consists of two itinerant story-tellers, a eurythmics supervisor, several eurythmics teachers, and an art consultant. The object is high-quality enrichment of the children's experience to offset the deprivation they suffer outside school.

(iii) *Supervision.* A project co-ordinator (similar to an LEA Adviser) is responsible for the preparation of new centres, guidance of teachers, the training of new teachers and aides, helping with the selection of children, evaluation of what is being done, and general visiting and supervision.

(iv) *Equipment.* Each centre receives a standard issue of large and small equipment and funds for running costs.

(v) *Daily Programmes.* Children attend for half-day sittings, the morning ending, and the afternoon beginning, with lunch. Each group is limited to fifteen.

An interesting feature of the Pittsburgh programme is that Fridays

are devoted to meetings with mothers and to in-service conferences or training sessions for teachers. The meetings with mothers are informal and are used for exposition and discussion of the classroom activities during the week and, indirectly, to communicate useful domestic skills. Not only do mothers and pupils spend the morning or afternoon in the centre, but younger brothers and sisters accompany them and have a foretaste of pre-school.

The value of these wide-embracing programmes was obvious in terms of human relationships and in the enrichment, through companionship, play, and so on, which children were experiencing and which was helping them to develop skills of speech, movement, manipulation and language, and to extend their imaginative faculties. This was compensatory education at an age before resistances have developed, and when it can effectively 'compensate' for background deprivations.

The experimental kindergarten programmes were of less direct interest, since they resembled good (but not outstanding) reception classes in English primary schools. The interesting features were their apparently fairly rapid evolution towards the English model, with increasing flexibility of group organisation, stress on the pupil as an individual, and a considerable degree of informal parental contact. I saw hardly a class in which there was not at least one parent who had dropped in for talk, advice, or to lend a hand for a while in class activities.

Normal programmes for primary (6 to 8 years) classes have been described by previous visitors as considerably more rigid than ours; what little I saw and heard, and a study of the curricula prescribed by the various boards of education, bore this out. The compensatory programmes which I visited in this age-range had well-defined remedial purposes and seemed again to be moving slowly towards English practice. The teachers had still to discover the best use of their new-found opportunities.

The Role of Aides

Aides can be counted a striking success in many of the programmes of compensatory education. Everyone concerned with them, from superintendents to the youngest teacher, spoke of their contribution with enthusiasm; the typical phrase on the lips of teachers was: 'I can't think how we ever got along without them.' This was significant in that many of the teachers and officers with whom I spoke admitted to earlier apprehensions about the introduction of non-qualified persons into the education service, and especially into the classroom. It was very clear that aides both release teachers from fringe duties to carry out the tasks which only they are trained to do, and that they can reinforce their efforts outside the classroom in ways not previously realised.

There is nothing haphazard about these results; success depends upon systematic planning and careful execution, and it is unlikely that a *laissez faire* policy of development would be anything like so effective. Recruitment, selection, training, deployment and actual use of aides all form a well-planned operation in accordance with a clearly-defined policy. A closer study of American practices in this field would almost certainly yield information readily applicable to our own situation.

Their range of duties is considerable and their selection is made with great care and a special eye to personal qualities, usually by a committee including the project co-ordinator and teacher representatives. All

aides receive training, much of it on the job, but prefaced by an appropriate crash course, full-time for part of the summer vacation in the case of the para-professionals. In-service training is a continuing affair for those in post.

By our reckoning, the scale of employment of aides is very large, in acccordance with Commissioner Howe's principle of 'critical mass'. The younger the children, the greater the reinforcement of the programme by aides. Importance is also attached to aides' functions with parents and the community; some of these functions are undertaken in England by other agencies such as the Education Welfare Service, maybe more efficiently as regards quality of operation, but certainly on nothing like the same scale.

In pre-primary and kindergarten programmes I found a classroom aide to each group of 15 children; with primary projects, one to each pair of teachers, and with intermediate grades (ages 9 to 12) one to a team of four or five teachers. The high school situation appeared less uniform, but each workshop or laboratory in a project seemed to have an aide of some kind. The 'outside the classroom' aides are additional.

In the classroom I visited, neither teachers nor aides were ready to split hairs; some aides were leading singing groups, helping with painting and modelling, hearing children read, and story-telling. I should say that the teacher's judgement and guidance are crucial; in American projects she is supported in this not only by her own Principal, but by weekly visits from the project co-ordinator. Some aides were not employed to the best advantage, but this was mainly due to the unfamiliar situation of teachers who had suddenly exchanged a class of 30 single-handed for one of 15 or 20 with an aide. I could not judge how effective were the groups of aides who work outside the classroom; project co-ordinators and principals seemed very satisfied, though most said: 'This is so new that we cannot yet tell its real potential.'

Some aides are working beyond the line of duty; at one Washington school they were running play groups and recreational clubs after the end of afternoon school, using school facilities and helped by some of the mothers. The principal declared that this met a crying need in the area. She added, in the classroom context: 'Never put an aide with a teacher who doesn't want one; some of the older teachers are too set in their ways to change.' She was full of praise for the team-work of aides with the teacher who does want one.

It is likely that a similar use of aides in this country would be to our advantage and would enable our teachers to do a better job; it is difficult to see, indeed, how we can otherwise command sufficient effective manpower to overcome educational disadvantage in deprived areas.

There are two necessary conditions:

(a) the working out of a systematic policy, as the American cities in question have done, concerning aides—their functions, recruitment, training and deployment; their contribution otherwise is bound to be limited;
(b) the creation of understanding public and professional attitudes towards them and an appreciation of the objectives in engaging them.

Team Teaching

In all three cities visited, team teaching emerged as one of the main elements in compensatory programmes. In Pittsburg, indeed, where a start was made as early as 1960 with the aid of Ford Foundation funds, a recent board of education report stated that 'team teaching has spearheaded what has become the compensatory education programme,' and went on: 'launched in 1960 in five elementary schools in disadvantaged areas, team teaching seven years later has become a way of life in 33 elementary schools and one junior-senior high school.' Its influence overflows into others too, and the concept of team work and joint planning is one which can clearly be applied in normal as well as in compensatory teaching situations. It is of special interest, nevertheless, that in all three cities, team teaching has been found valuable in working with disadvantaged children. It is no surprise to find experience of it concentrated in the earlier school and pre-school years, since this is where most of the compensatory programmes are found, but Pittsburgh believes that in the high school also team teaching across subject barriers is an aid to curricular advance.

In the elementary schools a team usually consists of a team leader, other regular teachers, a teacher intern ('student teacher' in our parlance) and a team aide. The team leader takes the initiative in leading discussion sessions, suggesting the next stages of work and acting both as consultant and source of ideas. She continues to teach full-time, or nearly so; in the examples I saw this gave her too little opportunity, in my view, to see at first-hand how her colleagues were faring. The team leader's personal qualities and ability to create a team spirit are fundamental to the success of a project.

Team leaders receive additional salary payments, and I encountered some feeling on their part that these should not be large lest they disrupt the team spirit; additional free time to move around the team would have been more valued. The teacher membership of teams is normally between five and eight. The proportion of aides to teachers is likely to be higher the younger the children are.

Team leaders whom I met stressed that team teaching was effective only if real advantage were taken of its opportunities. There must be some kind of daily contact between members, they must be resourceful in matching the size and composition of teaching groups to the work to be undertaken, they must create opportunities for real individual attention to pupils, and they must use the freedom they have swiftly to secure and try out new teaching materials, in addition to developing and passing on information about, their own materials. The services of a good aide as a kind of secretary/staff officer are invaluable, since the teachers do not then have to worry over details of equipment, apparatus, seating arrangements and so on.

Well organised team teaching can certainly produce more varied and interesting work of higher quality; it harnesses the combined efforts of a group of teachers and aides in such a way as to enable the average teacher to do better than he or she can alone. As a means of getting the best out of our resources, it may be an approach of particular value in compensatory education.

Priorities

Observing some aspects of education for the disadvantaged in the

USA is bound to be suggestive when our own problems are considered. It has been accepted that certain special measures of support and 'compensation' are necessary in our own Educational Priority Areas. What then are the priorities for further action in them?

First, I suggest that effort should go into the early years of education from the ages of 3 to 8. The Americans believe that it is there that the returns are greatest. It is true that in New York, for instance, older pupils are not excluded and there is indeed a 'College-bound Programme' designed for the under-privileged student who has the potential but lacks the attainment or the motivation to make his way to college or university. Suitable pupils are nominated by high school principals and supervisors from all the city's deprived areas. They are first brought together for a summer school and then given intensive teaching in small groups throughout their last year in high school. This is a bold and imaginative project; nevertheless in our context the early years must come first.

A generous provision of aides, appropriately selected and trained, would seem to carry very high priority on the basis of American experience. The principle of team teaching seems almost as basic to the success of these projects. To develop this here may require that LEA advisers should accept a direct role in our projects corresponding to that of the American project director.

The work of teachers' centres including both curriculum development and in-service training should be linked to local projects in compensatory education. Area training organisations and individual institutions and colleges of education should be invited to participate and to contribute to these plans.

Finally, one sees the importance of receiving, evaluating, co-ordinating and disseminating the information gained from compensatory projects. The Americans believe that this vital responsibility should be clearly assigned to a single agency. The Federal Office of Education accepts this as one of its major functions and this reflects a characteristically realistic belief that responsibility is best placed with the agency which controls the funds.

When the British India Line cruise ship Nevasa *sailed from Venice on November 15th 1968, for Athens, Antalya (in Turkey), Santorini (in the Aegean), Malta and Gibraltar, she had on board 1,017 secondary school children, 74 teachers, and 161 cabin passengers. This was routine cruise number 118; to some people it was adventure.*

Boarding-school Afloat

MARTYN CLÉMANS

Going on a journey is an exciting experience to even the most world-wise: to a child it can be almost overwhelming. One's stomach seems to be flying away, and one's mind is filled with vicarious images of strange places and happenings. It is a little bit frightening, wholly exciting, and not to be missed by anyone.

At the airport you sit and wait and try to chat with friends, but it is difficult to communicate because your thoughts are not on the real world at all. You feel hot and sticky, cold and apprehensive by turns. Above all you wish you had stayed home with mum, where everything was safe.

Many of the teachers are edgy at this stage too. But they will be frightened of different things: of losing someone in Venice; of having a sick child to add to the burden of all the healthy ones; of having someone do something nautically naughty, like climbing the mast or, worse still, falling overboard. Some teachers too might not be over-enthusiastic about aircraft, or fear the ignominy of being sick in full view of the very people they most want to impress. In the event they are not sick, and the flight is smooth and clear, and they can talk to the children about fold-mountains and Alpine uplift, and glaciers, and water-tables, and river valleys, while everyone cranes their necks to see snow-covered mountains and thinks the clouds look like ice cream castles in the air.

The children on British India Line cruise 118 mostly came from the north-west London boroughs of Barnet, Brent and Harrow, but there were also sizable parties from Cheshire and Lancashire with them. In all 26 schools took part, 18 of them from London.

To get some idea why heads were willing to devote two weeks in term time to the activity of crusing, five schools were visited before the journey began.

Views of the value of the enterprise varied widely. Obviously former (and present) secondary modern schools tend to emphasise the social side of things while grammar schools do their utmost to find links with academic work. One school on cruise 118, for instance, had sent only third year children who were taking the Cambridge Non-linguistic Classical Studies Course. The cruise was seen as part of the course.

Many teachers emphasised the problems of those left behind, for in no

case among those schools visited was an entire class going. The hole left in the time-table takes a good deal of filling in some schools, especially for craft teachers. Here equipment and safety considerations dictate the re-arrangement in the time-table that can be made.

The other problem is one of feeling left out. The school may be following the journey on a map set up in the foyer, and some children, whose liking for geography is already not great, will be further adversely influenced.

The other point is cost. This is not cheap for parents and they will want to see to it that the children get the best out of it. Most schools seem to have at least two meetings with parents, one when the idea is first floated and another when the domestic arrangements are made. Usually parents have two years notice—two years in which to find £66 (£56 + £10 spending money).

Sixth formers, I was told by one school, are showing decreasing interest in this kind of journey. The reasons appear to be that older pupils have wider general opportunities to travel and will (or would like to) regard themselves as adult students. When younger age groups are included in the party, discipline has to be geared to the youngest children. The wholly sixth form cruises British India Line run are well supported.

Cruise 118 was a term-time journey. What is to be gained by spending part of the term at sea rather than in school? Social factors loom large —the opportunities for day-school children to live and eat together for a time; the meeting of groups from different ends of the country. Undoubtedly going on a ship of this kind is a major experience for most children, one that they will carry with them for their entire school lives. There is a lot to interest a student in this new environment and from the journey, geography really becomes meaningful.

Undoubtedly one major disadvantage was the fact that the students were drawn from groups up and down the school and not from a limited age-group. This meant that effective teaching was difficult. However, it may be that the children on such a trip, if they have been effectively prepared beforehand, gain a great deal simply from being given new and novel experiences and being placed in stimulating situations.

The *Nevasa* is a vessel of 21,000 tons, and is a converted troopship. The children occupy the dormitory accommodation in the forward and after part of the vessel, in what were formerly the troop decks. This accommodation is adequate but not lavish. Showers and washing facilities are attached to each dormitory. Eating is by cafeteria method, trays with divisions being used. The food is plain but good, being about the same standard as the best school dinners. Unfortunately, shortly after leaving Venice on this particular occasion, the wind was gale force 8 and *mal de mer* reached epidemic proportions so that nobody wanted to eat very much.

The *Nevasa* was built on the Clyde and delivered to the British India Line in 1956, when the Line chartered her to HM Government as a troopcarrier. When the troop contracts ended she was 'mothballed' for a time then converted and brought into service together with the *Devonia* and *Dunera* (also former troopships) with which the com-

pany had pioneered educational crusing in 1961. In 1968 the *Uganda* replaced the *Devonia* and *Dumera*.

Aboard the *Nevasa* there are 17 classrooms capable of seating 420 and an assembly hall that can seat 460. The ship has a fully equipped hospital able to deal with any (likely) major operation.

The school side of the ship is administered by a Director of Education and two deputies. Six masters-at-arms help maintain discipline on board, with regard to safety, and exercise a twenty-four hour watch throughout the ship. A matron and six assistant matrons work in the girls' dormitory accommodation. On board the *Nevasa* for each cruise are a number of former students, who help run the school office, and two girl PE instructors from Dartford College of Education, who organise games, under direction of the Staff Second Officer.

For administrative purposes, students are divided into six almost eqval groups (i.e. they remain in their school groups). They go with these groups to meals in the cafeteria and to all group functions throughout the cruise.

The ship-day is divided vertically into four kinds of activities, assembly hall, classrooms lessons, games and private study. One-third of the students will be in the assembly hall for a lecture or film while another third are in classrooms. The remainder will be divided between private study, games and swimming.

In the assembly hall, lectures are given on aspects of shipboard life, and on the ports of call. The school staff usually give the port lectures, and the ships officers supplement this programme with talks about the sea. In addition there are usually a number of guest lecturers.

Classrooms activity varied from school to school. Most schools made some attempt to prepare their students for what they would see on shore. This task was easy enough in Athens, which many teachers know well, but for Antalya and Santorini they were less well-equipped. This applied equally to the education staff of the ship, for Santorini had not been visited before, and is by no means a typical Aegean island. However, there is abundant information available and some teachers took the trouble to become well-informed.

Some classroom time was taken up with money matters. The reason for this is that the classroom periods are the only time that the party leader responsible for the students' pocket money (which is handed out daily, usually in 10s amounts, with more the day before going ashore) can get all the children together and easily accessible.

Private study time, which occupies one sixth of the time-table, is to allow students to work on their own projects, to write to their parents, to use the map room, or simply to relax. During this time escorted visits are made to the bridge and engine room.

Many teachers are not sympathetic to the idea of private study anyway and feel (even in school) that this is better used in classroom work. In the *Nevasa* the accommodation students have for private study is not very conducive to work. Undoubtedly, what is needed is a well-equipped library capable of seating all those students who would want to use it, and supervised by a trained librarian. But we live in a world subject to economic pressures: the only way private study accommodation could be provided would be by reducing the cabin

passenger space. If you do that the students fares would have to be raised—and they must already be at the elastic limit.

The other major criticism of the time-table by teachers was its seeming lack of flexibility. Many would like to see more time spent on deck when in sight of land, and more spent in the classroom when out of sight of it. It is undoubtedly aggravating to be stuck down on C deck when passing through the Aegean or along the coast of North Africa. But what is the alternative? Do you get 1,000 children all on deck together? (This is sometimes done). How do you hold their attention when you do this? And for how long? As things are it roughly works out that every group will be on deck when some land is in sight at some time during the journey.

The Teachers' Day

Educational cruising can be arduous for the teachers taking part, especially on the first cruise. The children wake, or are woken, at 7.00 am, usually by the playing of a pop record. *Those Were The Days*, by Mary Hopkin, was popular on 118. (She once travelled as a student on the *Nevasa*.) The teachers officially arrive on duty at 8.30 am although some go down before their own breakfast to see that everything is all right. During this early period of the day the children are under the charge of the ship's staff (masters-at-arms and matrons). At 8.30 am the process of tidying the dormitories begins, ready for Captain's Rounds. The children have to be out of the dormitories between 9.00 am and 11.00 am. At 11.00 am they are allowed back to get a change of clothing or to obtain swimming costumes. The time-tabled day is divided into six periods, fifteen minutes change-over time being allowed between each, and an hour and three-quarters for lunch. The school day begins at 9.15 am and ends at 5.00 pm. The first period, for the group time-tabled for the assembly hall, consists of a voluntary non-denominational church service. The following three assembly hall periods were usually devoted to a lecture on the next port of call given to successive groups of students. The same lecture is thus delivered three times with only a short break between each. Lecturing in this way is particularly arduous, and one sympathises with the staff of education officers if they cannot put as much into each as they might sometimes like to do.

After the end of the school day some voluntary activities are run by the ships officers and volunteer teachers willing to give up free time: philately, navigation, photography and chess are examples of what is done during this time.

The students' evening meal begins at 6.00 pm and from about 7.00 pm until bed-time at 9.30 pm they are again free to follow their own devices. There is dancing most evenings, table tennis in the games room, and some evenings a quiz, beetle drive, twenty questions session or sing song. These activities are organised by the ship's staff in conjunction with teachers, and teachers are expected to follow a duty roster and to patrol certain areas throughout the day, and up until 10.30 pm (until 11.30 pm. on the last three nights of the cruise to prevent dormitory raids). The days when one is on late duty can be extremely tiring for a teacher.

Smoking and school uniforms were two items that generated the most heat at staff meetings at the beginning of the cruise; discipline drew

more attention later. The system, and it is the usual one obtaining on cruises nowadays (in the early cruises no-smoking was the rule) was for students of 17 and over to be allowed to smoke if they had a pass issued by their party leader. They could not buy cigarettes, the teachers had to supply them.

There was the expected division among teachers about school uniform. To many, school uniform is the way out of the dilemma of what is, and what is not, adequate dress. This sumptuary law produces uniformity and facilitates counting heads, but does not eliminate the mini-skirts and in some ways increases the children's vulnerability in foreign ports. At least one teacher got around the problem by sending all his girls ashore, in Turkey, in trousers, in spite of advice against doing this at a party leaders' meeting. He had no trouble, he said, except that the woman teacher with him—a respectable matron in knee-length kilt and cardi—got her bottom pinched.

How does cruising compare with other school journeys? Teachers attitudes are important here. Teachers who themselves enjoy cruising tend to say the childern get a great deal out of it, and that it is very good for them: they actively search out the good things. Those who do not themselves enjoy shipboard life, point to the short stays in port (50 hours out of 14 days at sea) and the difficulty in making contact with 'abroad'.

One or two teachers, conscience-stricken perhaps, compared the food and accommodation that they were getting free with what the children were paying £56 to have. They felt they were being bribed because they eat with the cabin passengers and do not live in dormitory accommodation. If they are used to making land journeys with students they will feel this double standard—this 'them' and 'us'—acutely. It is only fair to say that plenty of teachers revel in this difference. There is nothing the Line can do about this anyway, and those who feel it strongly enough would be at liberty to eat every evening in the cafeteria if they wanted to.

These same people are obviously hurt by the children's exclusion from the passenger lounges and public rooms, a thing which does not happen on a land journey. A wholly school ship would be the only way to avoid this.

Many of the problems party leaders face, stem from the fact that their children—and they themselves—are in constant contact with others from other schools. This contact is in itself a good thing, but it does mean that exuberant behaviour multiplies and some students, normally restrained by the presence of sensible mates, have examples that are not always felicitous.

This leads one to ask, what does a child get out of the boarding school side of things? British India Line, in its literature about the cruises, stresses the living together nature of cruising:

> Over 900 children living in the comparatively confined space of a ship must and do learn to share together and to create, in a short time the *esprit de corps* which is the hallmark of a good school.'

A thirteen-year-old girl, in an essay that won the Captain's Prize, put the same thing more colourfully.

> One of my first impressions of life on board the *Nevasa* was the great feeling of communal life. You can really feel that everyone is

> trying to make the cruise a success, everyone is pulling together. This can't be described, it's just an undercurrent of enthusiasm that you can sense. There are so many people and so little space that it's really wonderful that everyone manages to live happily and unselfishly.

This is undoubtedly a very useful aspect of these cruises. One teacher commented, 'At home my kids have everything done for them, mum makes the beds, serves up the food they like, makes life safe for them. Here they have to make their own beds, tidy up their dormitories and—up to a point—feed themselves. No one is going to persuade them to eat—the food is there, they take it or leave it. Most children don't leave it for long and I am sure they come back eating things that mum could never have got away with.'

Other teachers stress the human relationships angle. 'I know these children now, in a way I could never have hoped to have done at home, since I have been with them morning noon and night for two whole weeks. Of course, they know me, too, I've become a person to them. I don't think discipline or respect suffers if the children see us with our hair down a bit! I'm all for it.'

So much for social relationships; what about academic progress? Obviously geography and history benefit in some measure. Exactly how much is difficult to say. Religious instruction ought to be more meaningful to children who have actually visited the sites where St Paul preached—Perga and Aspendos are near to Antalya where the *Nevasa* put in. Each child now has a peg on which to hang new experiences, 'the beginnings of schemes of knowledge,' a psychologist might say. The next time Greece or Turkey—or even a ship at sea—makes news he (or she) can say I know something about this!

Measuring the impact of experiences is always difficult. However, of the Turkish port of Antalya one student wrote.

> We packed into the lifeboats and sailed into the colourful harbour of Antalya. American cars were parked nearby and small fishing boats were anchored in the harbour. We all clambered out and stood in groups, wondering at all the men, who stood staring hard at us. It was amazing how many of the male population had nothing to do that morning, yet there were no women to be seen.

and another:

The Paupers of Antalya

> 'As I walked down the main street of Antalya I was struck by the sight of so much poverty. At intervals along the street were beggars claiming some disablement, others obviously could not possibly earn a living by any other method than begging. The State obviously did not provide some form of institution for the disembodied.'

Perhaps the sad part is that not everyone can go on a British India Line cruise; that not all parents can or will find the money, for one always feels sadness for those who are left behind, and it is inevitable that this will colour the way the teachers, and the students, will think, and talk, and act, about their joint experiences.

Recent research work has produced some evidence about the different effects of co-education and single-sex education. Although not conclusive it cannot be ignored.

Co-education in Secondary Schools

R. R. DALE

Discussion on co-education has in the past been hindered by prejudice and stereotyped ideas, conditioned by tradition, and founded on an unfortunate ignorance of relevant facts. There has been confusion in the minds of observers between effects due to co-education and those due to the different social class intake and higher percentage entry of co-educational schools in general. The confusion has been increased by identification in the public mind of (a) the high academic standard of the direct grant schools and (b) single-sex education, as if the former were a direct consequence of the latter, rather than due principally to the highly selective entry of those schools. Nothing that is said in this article should be taken as criticising in any way the dedicated work of teachers and heads of single-sex schools, but good as this work has often been it is the duty of all, in the interests of the pupils, to consider whether it could be improved in any way.

Before giving an account of the research brief mention should be made of salient facts in the history of co-education at the secondary level. Apart from a few pioneer private boarding schools such as Bedales and some of the Quaker schools, grammar schools were rarely co-educational until the implementation of the Intermediate Education Act of 1889 in Wales and the Balfour Education Act of 1902 in England. Those state schools which were co-educational were set up not because of a new philosophy of education but because in rural areas it was uneconomic to provide a school for each sex. In recent years, however, the outlook of educationists has been changing, influenced by the modification in the attitude of the public from Victorian ideas about relations between the sexes towards a freer relationship, as well as by the psychologists and by the publication of research papers. It is a movement which is not confined to this country; Russia changed over to co-education shortly after the end of the Second World War and Sweden quite independently, as a result of research reports has also made her state system co-educational. Scotland and the United States are of course examples of countries who have long had such a system. In England and Wales also the trend in school organisation is in the same direction, and its pace is increasing.

In the remainder of this article the aim is to give a concise summary of research findings on the subject; it will be seen that some aspects of the problem have been more thoroughly covered than others, but it was felt that enough had been done to justify a general appraisal.

Attainment

The attainment of the pupils is an obvious criterion by which a school may be judged, though it should not be the only one. It is also easier to obtain a measure of this than of other criteria. The only researches on

this topic, apart from a minor one by Cameron, are all based on a comparison of the results of pupils from co-educational with those from single-sex grammar schools at the first schools external examination. Tyson, in the twenties, using thousands of pupils and hundreds of schools compared the results of co-educational and single-sex schools which entered pupils for the NUJMB* examination. He found co-educated boys to have a statistically significant superiority over boys from boys' schools in most subjects, over several years, while girls in girls' schools had a smaller superiority over the opposite group in fewer subjects, though mathematics showed a reverse difference. When only rural schools were compared the superiority of the co-educated boys was increased and the slight inferiority of the co-educated girls almost vanished. There are other important variables in addition to urban-rural differences. For example, the co-educational schools would almost certainly have a lower social class entry (which research has repeatedly shown to be associated *on average* with poorer academic progress), and probably a rather less highly qualified staff. Again the girls from girls' schools were older when taking the examination, and dropped more of their weaker subjects. All these factors handicapped the co-educational schools in the comparison of attainment, though they were not a necessary accompaniment of co-education. The only factor identified which favoured the co-educational schools was the greater 'premature leaving' rate, though this should be considered against their much higher percentage *entry*.

The general trend of Tyson's findings is confirmed by a series of large-scale regional investigations. It would therefore now be unwise for anyone to suggest that single-sex schools, *because of the single-sex nature of their organisation*, secure a higher attainment level from pupils of comparable ability than that secured by co-educational schools, as assessed by results in the GCE O-level examination.

The most recent of the above studies is that of Sutherland in Northern Ireland. In an analysis subject by subject she confirmed the superiority of the co-educated boys, and again found a smaller difference between the girls' groups in favour of the girls in girls' schools. However her data indicates that the girls in girls' schools (and boys in boys' schools) had an appreciable social class advantage, which should in itself have raised the attainment level; they also had only 12 per cent of girls who had taken the shortened five-year course as opposed to 29 per cent of girls from co-educated schools. As the lead of the girls' schools is only some one or two per cent in most cases, this age factor becomes important.

All in all it seem probable that co-education benefits the attainment level of boys, possibly because of a greater conscientiousness among the girls, and the friendly rivalry between the sexes. Though this advantage is not great it is brought about in spite of the handicaps to the co-educated boys which have previously been mentioned. With the girls the picture is not as clear, most research giving girls in girls' schools a slight advantage except in mathematics, but before assessing the probable effect of the other factors.

The work of Douglas† *et al* is omitted because, though it is valuable

* Northern Universities Joint Matriculation Board.

† J. W. B. Douglas, J. M. Ross, H. R. Simpson, *All Our Future* (Chapter 10) London, 1968 (Peter Davies)

otherwise, its grammar school sample is too small, its division into only two social classes is too coarse and its findings lack a consistent pattern. Though they conclude their analysis of attainment by writing, 'There are, it seems, both advantages and disadvantages *about co-education*', it is evident from their own figures that another powerful variable must play an important part, namely the more able and higher social class entry to the single-sex schools, which should ensure that these pupils make *better progress* than their less able and lower social class counterparts in the co-educational schools. That, as Douglas's own figures show, they do not always do so is a matter of some interest. A fuller analysis is given in *Where*, May 1967. Readers will realise that attention is here focused on average tendenices, and that other forces create a wide range of attainment between schools of any one type, whether boys', girls' or co-educational. The differences found are not large when compared with the great area of similarity. Another limiting factor is that the criterion has been confined to attainment at about the age of 16.

Emotional and Social

Fundamentally more important than a child's attainment is his or her good social and emotional adjustment. It is, however, more difficult to measure, and research has only recently made explorations into the problem.

Some years ago Lotz in New York compared the emotional and social development of boys and girls educated in a co-educational high school with that of pupils in two single-sex schools, testing some pupils at entrance and comparing their scores with those of groups of older pupils in the same schools. He concluded that the type of schooling made little difference to the boys, but that the co-educational schooling was better for the girls. As, however, his sample consisted of only three schools, the findings cannot safely be generalised especially to British institutions. Investigations in Britain have been mostly with those ex-pupils who were training to teach but the samples are large and the pattern of results remarkably consistent. Probably the most important research is one which surveyed the attitudes to school of those ex-pupils who had attended both a co-educational and a single-sex grammar school, a sample of 620 women and 175 men. (Dale, 1966 and 1969.) Among other questions they were asked to estimate whether their life at school had been Very happy/Fairly happy/Jogging along/Rather unhappy/Very unhappy. The result was quite clear cut. More than nine out of every ten men said they were happy at their co-educational school (half 'Very happy' and half 'Fairly happy'), but only a quarter of the sample said they were 'Very happy' in their boys' school and a third estimated 'Fairly happy'. While ten out of 186* said they were 'Jogging along' when co-educated, this rose to nearly one in five when they were in boys' schools. Surprisingly as many as one quarter were unhappy in their boys' schools; the corresponding proportion in co-educational schools was one in 27.

The opinion of the women was similar. Well over half estimated they were 'Very happy' while co-educated, but only a quarter said the same about their girls' schools. Rather more than a third were 'Fairly happy'

* This is greater than 175 because a few students had estimates for more than one school of the same type.

at both schools. Only six per cent gave the neutral response 'Jogging along' for their co-educational school, but one in five for their girls' schools. At the girls' schools three times as many were unhappy as at the co-educational schools (117 to 38). The results for both men and women are more favourable to co-education than the results of two previous large scale surveys (which were also favourable). This may be because in the later survey the respondents were able to compare the schools from their personal experience.

Related questions on the atmosphere of the schools and the friendliness of teachers produced similar results, both men and women students finding the atmosphere of their co-educational schools pleasanter and the teachers more friendly than in the single-sex schools.* When we look back on our schooldays we think with gratitude of a teacher or teachers who had a strong and good influence on us, and more exceptionally perhaps of the teacher who had a strong and bad influence. These ex-pupils were asked about their own teachers and their estimates 'for good' were more favourable for the teachers from their co-educational schools than from their single-sex schools. This and all the previous findings from this survey remained true when the order in which the schools were attended was kept constant.

In the same survey a number of questions which are on the periphery of the emotional and social field all gave results which favoured the co-educational school. For example they considered prefects were more officious in the single-sex schools, their staffs more out of touch with modern adolescents, and in these schools they 'felt they were grown up but treated like children', while the women felt that their girls' schools made much more unnecessary fuss about small details than did the co-educational schools.

We find also in previous surveys that co-educated men are much more sure of their ability to work with and to work under the direction of members of the opposite sex than are men educated in boys' schools. Both male and female ex-pupils who had been co-educated believed much more strongly than single-sex educated pupils that their school life had helped them in their relations with the opposite sex: many of this latter group felt that their school life had hindered them in this respect. One of the most interesting findings and one with a markedly decisive result was that those ex-pupils who had attended both a co-educational and a single-sex school felt very strongly indeed that it was in the co-educational schools that there was a 'healthier attitude towards sex'. Other results in the social and emotional areas will be available later. So far the findings seem strongly in favour of the co-educational school, but is is possible that there might be questions not yet asked which would produce results favourable to single-sex schools.

No doubt teacher readers from single-sex schools will protest vigorously against these findings, and one sympathises strongly with those Heads and members of staff who have conscientiously done their best for their pupils—and they are numerous. It begins to appear likely, however, that it is not the innate personality of the teachers in the different institutions which makes the difference but the environment in which they are placed, the principal differentiating force being an

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* In the case of schools attended last the difference between the men's groups fell a little short of statistical significance for friendliness of teachers.

ameliorating effect which the two sexes have on each other's conduct in school, both as pupils and as staff.

In all the surveys the pupils and ex-pupils and also teachers were able to add their 'free responses' to a number of questions. These responses have been analysed and their classification throws light on the interaction between pupils and teachers, and girls and boys. Many teachers comment that the presence of girls improves the conduct of the boys, while the opposing belief is almost completely absent. Another finding is that male teachers are in general more popular with girls than are female teachers; whatever the rights or wrongs of the preference we are here concerned with its influence. To theorise for a moment, it is therefore likely that the girls in co-educational schools will be under a self-constraint to behave better, partly to please their male teachers and partly in order not to 'let themselves down' in front of the boys. We have therefore a situation different from that in a single-sex school in so far as there may be in-built psychological forces within the pupils of both sexes constraining them to behave better than they would in single-sex schools. This is actually what we find in practice, pupils consistently estimating that discipline is more severe in single-sex schools than in co-educational. They are also of the opinion that where discipline is not satisfactory it is usually shown as undue severity in single-sex schools and too great leniency in co-educational ones. Needless to say these are average tendencies and it would no doubt be easy to find individual instances where the reverse is true.

School Preference

The nature of the experience of pupils and teachers in the two types of schools would appear to provide a useful indication of the relative merits of the schools. The estimates of the teachers are given first.

The teachers. An early researcher in this field was Moreton, followed by the writer in 1946 and then by W. E. Davies. On fundamental findings all three are in agreement. The writer's surveys include one which used a sample of teachers who had taught in both co-educational and single-sex grammar schools, and their verdict is particularly important. Although there were only 238 their results are substantially the same as those from much larger samples of teachers who had no such double experience or where the relevant percentage of the sample is unknown.

In the survey in Glamorgan of which the 238 are a sub-sample there was an 83 per cent return of questionnaires from grammar school teachers. They were asked, 'Are you in favour of co-education in secondary schools?' and could reply Yes or No or Undecided. They could further state what type of co-education the preferred, full co-education (Type A) co-education with mostly separate classes (Type B) or dual schools (Type C) or single-sex schools or undecided. The verdict of the sub-sample was heavily in favour of co-education. If we combine Types A and B as opposed to single-sex plus C (omitting a negligible percentage of undecided) in co-educational schools A + B is 94 per cent, in boys' schools almost 80 per cent and in girls' schools 64 per cent. Those choosing B are only about 10 per cent. The same type of results have been obtained in all the enquiries made, whether in England or in Wales.

Perhaps the most important finding is that the bulk of opposition to co-education came from those who had no experience of it, either as a

pupil or as a teacher. Considering the variations in human personality, in school buildings, and in school heads, the near unanimity in the approval of co-educational schools by those who teach in them is quite astonishing.

It could be objected that the preference for co-education might be expressed for reasons ether than educational—either consciously or unconsciously; teachers might merely find such schools pleasant places in which to work. In reply it might be maintained that the happiness of the staff would be reflected in the education given to the pupils. In addition, the comments made by the teachers in the writer's survey stressed the benefit to the education and social development of the pupils.

The ex-pupils. In three enquiries involving several thousands of ex-pupils, who were training as teachers, their experience in school was drawn upon to obtain, among other things, some estimate of their preference for co-educational or single-sex schools. All three yielded similar results, strongly in favour of co-educational schools, but only the most important one is reported here, in which the sample consisted of students who had attended both a co-educational and a single-sex grammar school. They were asked the same question which was put to the teachers, with the results given in the following table.

'Which did you prefer, the mixed or single sex school?'

School preference	Men		Women	
	N	%	N	%
Single-sex 'much'	25	15.1	68	11.6
Single-sex 'a little'	15	9.0	46	7.9
No preference	13	7.8	33	5.7
Mixed school 'a little'	13	7.8	75	12.8
Mixed school 'much'	100	60.3	362	62.0
Totals	166	100%	563	100%

More than two-thirds of the men and three-quarters of the women preferred their co-educational school to their single-sex school. Their free responses indicated a serious and thoughtful attitude to the question and concentrated mostly on good social and emotional adjustment and preparation for life in the adult world. A subsidiary but important aspect for girls was that the mixed staff as well as the presence of boys, improved the atmosphere of the school.

The objection might be made that this sample is not representative of the general grammar school population as all its members were intending teachers. The reply is three-fold, first that choosing a sample in this way placed the single-sex and co-educational grammar schools on an equal footing, second that these are particularly responsible ex-pupils who are interested in educational problems, third that another, admittedly subsidiary investigation but with a wider sample, gave a similar result. The whole of the sixth forms of ten grammar schools completed a questionnaire administered in eight cases by the writer, which included the question 'Which do you think you would like better, a school of (a) Boys and Girls together, or (b) Boys or Girls only?' Replies were anonymous and not seen by the school authorities. The percentages favouring the co-educational school were: in the

co-educational schools 100 per cent in three, and 90 and 92; in girls' schools (86 pupils), 67 and 63 per cent; and in boys' schools (42 pupils) 88 and 85 per cent. The five co-educational schools had 107 pupils of whom only three boys and no girl would have preferred a single-sex education.

Comment

The assessing of opinion, even if this opinion is based on experience, cannot be conclusive. Nor can it be ignored. The preference for co-education is registered in spite of entrenched loyalties and the cherished traditions of many single-sex schools. Yet more work needs to be done in assessing the truth of whatever claims girls' schools and boys' schools may make that the *single-sex nature* of the education they provide produces better citizens. Only a few of the answers have been given here.

Though research results so far point to co-education as being the better form of education, in our society, yet this is only one of a complex array of factors which determine whether a school's work will be good or poor. Some of these forces are even now changing rapidly, and the considerable increase in the proportion of married women on the staff of girls' schools together with the inclusion of male teachers must have made changes in the social interaction of staff and pupils. In this connection it should be mentioned that the most important ex-pupil attitude survey took place in 1966-7.

Can the business historian make a contribution to the knowledge of our time?

Business History

RONALD G. GARNETT

To most scholars and educationists business history remains dubious. Indeed, many would aver that business history is so lacking in academic rigour that it hardly warrants any mention, adverse or otherwise: it has no methodology, cannot claim to be a subject in its own right, and it is scarcely taught. All that business history can lay claim to is a disproportionate shelf-space in public libraries (because its volumes are sponsored, subsidised, or in the form of gratuitous glossies), a motley of writers, and a limitless source-material.

Business history has not yet gained academic respect because it is mainly the province of writers with little pretension to scholarship. They are often hired or retired 'organisation-men' embarking on their first literary efforts and imbued with the idea that anything historical perforce is romantic, especially when it portrays founding fathers, their dynasties and generations of loyal retainers. Hence the justifiable accusations of bias—there have been no sponsored histories of unsuccessful firms, if only because funds for hiring historians would not be available. Moreover, the business historian is usually confronted with and restricted to using business records which are of limited value as being bare accounts of decisions taken in the form of board room minutes. Business-house histories are generally commemorative publications and are steered towards public relations rather than scholarship (although there is no reason why there should be inconsistency between these two approaches). The general impression of business histories is that they are in varying proportions anecdotal, archival, aoristic and adulative—their saving grace is that they remain largely unread.

No received definition of business history can be offered because the subject has still to emerge. Business history has its own chequered history since Harvard University created a professorship and a *Journal of Business History* exactly forty years ago. Despite its apparent acceptance in the United States, business history has drawn many critics and apologists but few substantial converts. As late as 1958 the American historian H. Krooss lamented that business history had not lived up to its potential: 'It is the most vexatious, exasperating and aggravating of all historical disciplines and has never been as important as it should be . . . Economic theorists apparently do not even know it exists . . . and economic historians distrust it.' The subject was vague, it had no vade-mecum, no classical texts, only anthologies, and it had no theme. More commonly, business historians wrote as though economics did not exist. Business histories could throw up snippets and reflect highlights, but they lacked any systematic analysis or meaningful framework.

Yet a lack of definition need not be a detriment—the metamorphosing of commerce into much wider business studies has brought prestige

and parity with other subjects, but is would be foolhardy to attempt to define the nature of business studies. Within the field of further education, business studies are growing and there are a number of interesting courses relating business studies to technology and sociology. There are also well-established courses at university level in the history of science and technology, but there is scant evidence that further education, and still less, higher education, is willing to consider the validity of business history as an adjunct to business studies. (The McMeeking report, several years ago, recommended that business historians should be appointed to the staffs of colleges of commerce.) Perhaps this reticence is understandable when one bears in mind the reservations given above, but the neglect seems to be more of ignorance than of foreknowledge. Although Britain had nurtured scholarly business historians (cf. Unwin) before America adopted the subject, yet the English universities have steadfastly refused to concede that business history, even at its best, is more than a diversion for University economic historians. Admittedly the *Journal Business History* was first published by Liverpool University Press in 1958, and Glasgow University subsequently founded a lectureship in business history, but there have been no further developments, despite the fact that the number of adequate business histories has mounted appreciably during recent years. The subject can hardly be disparaged when it can call upon such leading scholars. But no one *teaches* business history. It is not suggested that lecturers in business and related studies are unaware of the resources and references abounding in business history; economic historians use it, and technologists may refer to it, but in the educational hierarchy in Britain business history *qua* business history has not moved much beyond the check-point stage.

To know all is to explain all, and it can be argued that one cannot build a subject from a series of disparate monographs written not only by economic historians but also by representatives from many other disciplines. Business history still lacks the promise of a synthesis. How, if at all, might a synthesis emerge?

Without attempting to define business history, it can be said that its investigations are broadly in any one of at least four fields which are not entirely mutually exclusive:

(i) *Micro-studies*—business-house histories.
(ii) *Sectoral*—histories of industries or institutions.
(iii) *Global*—either stage histories in the Gras tradition or generalised histories of business and the business community.
(iv) *Comparative*—the most recent and perhaps the most promising approach to business history. Comparative studies may take the form of an analysis of selected firms within an industry or from several industries.

An excellent example of this type of business history is Alfred D. Chandler's *Strategy and Structure* which investigates how four leading firms Du Pont, Standard Oil, Sears Robuck, and General Motors carried out common activities of manufacturing, marketing and administration. Chandler develops from his material interesting concepts of determinants and processes of structural and organisational change. Further studies on this pattern will provide a more meaningful evaluation of changing business enterprise than could be thrown up by a whole series of discrete business-house histories.

After spending some time teaching business history at an American Graduate School of Business, the lasting impression is that American students are highly susceptible to business history in that whatever historical background they lack, they compensate for it by being attuned to the importance of business in society and are keen to analyse the concepts and motivations of changing business strategies.

Perhaps a word on economic history would be in order here, as the connection between economic and business history is a close one. Economic history is a great consumer of theories: it has been used as a vehicle for Marxist determinism and stage analysis, and as a proving ground for economic growth, but economic history *per se* has, like its offshoot business history, little methodology and less philosophy. The infinite subject matter, the continuous wave theory of H. A. L. Fisher simply masks the fact that explicit assumptions about random variables must be made in history as elsewhere, yet the economic historian perforce is restricted in his investigations to extant data—sampling the evidence is not always possible due to its paucity. He must avoid crude statistical inference, but there is sometimes a place for assessing otherwise intractable material in probablistic terms. He should ask 'Under what conditions, with what evidence in hand might we have predicted the observed outcome?' The economic historian should, in sum, seek the limited generalisation that is the objective of all science.

Likewise, business history cannot say much of value about business in general—it cannot be concerned with the growth or nature of all enterprise. It too is concerned with the relationships between the unique and the general. H. A. L. Fisher once wrote that great history is not made up from laundry bills. Charles Wilson in his monumental *History of Unilever* commented on the assertion:

> 'There is a measure of truth in it; it is not necessary to claim that business history is history of the highest calibre. But it has one merit; it brings the historian to close grips with a problem fundamental to the philosophy of history—the essential relationship of the individual and society.'

Business history is in a good position, perhaps a better position than economic history in general, to prosper from the above approach to methodology. The sources for business history are virtually untapped and the basic problem is one of sampling and seeking the representative variable. (The danger is that business history so far, errs in being too highly specific.) The pressing need is for business history to throw up generalisations which would be rigorous and interesting to scholars from other fields. It would seem that the emergence of business history as a reputable discipline will depend on the subject being more multi-disciplinary and no longer the preserve of economic historians *unless* economic historians are prepared to develop additional specialist interests. Economic historians are many things, but they are notoriously *not* accountants, nor production engineers, nor are they interested in materials control and handling, organisation and decision theory, and social anthropology. They are familiar with banking, but not insurance; they know more about eighteenth-century mill-owners and their mills than the late nineteenth-century works managers and factory organisation. We cannot expect economic historians to know all, but we should not condone the general lack of attention paid to say the nineteenth-century chemical industry, the beginning of mass production, the

interrelationships of technology and organisation, the development of mass markets for consumer goods. A business history of Britain since 1850 has yet to be written; we know very little about nineteenth-century business methods.

It is relevant to say something on the writing of business history, as business history still remains so much underwritten that the business historian is primarily a researcher. The writing up of business history raises the problem of narrative versus analysis, of explanation rather than description. There should be an analysis of business decision-making, but should business history concentrate on illuminating entrepreneurial motivation and the decisions process? Although decision-making is at the root of a firm's activities, yet analysis of business decisions may be intractable and intangible because relevant data may not exist—businessmen do not always explain, and sometimes cannot explain how, why, and by whom, policy decisions were formulated and resolved.

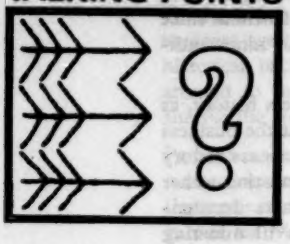
Perhaps more emphasis should be laid on certain key aspects in a firm's history and less on a synoptic survey of its growth. The major features could well be organisational change—an investigation of the effects of corporate growth on administrative systems; of decentralisation and recentralisation; product and service diversification; of post take-over bid performance; of group enterprise; entrepreneurial succession; perhaps even a study of the inertia of corporate resources which exert their own pressures—areas of discretion in business policy are to some extent size-determined. Business history can also explore whether hypotheses on the influence of technology on business systems and marketing are tenable.

The writing of more worthwhile business history should also help in testing economic theories of the growth of the firm and of economic growth models:

> 'Big theories of economic growth fail to account for the complex facts of life and little theories frequently contradict one another.'
> (C. Kindleberger)

So far, the historian has provided the social scientist with little empirical data on which to base generalizations concerning business administration: nor have historians formulated many theories of their own . . . Yet what would be more interesting and fruitful than analyses of changing methods for planning, co-ordinating and appraising effective use of resources of men, money, materials and machines over the past century, and particularly since the inter-war years?

TALKING POINTS



By Question Master

Born at the wrong time?

It is alarming to think that the month of the year in which a person is born can have an effect on attainment in later life, but it seems it can. This has nothing to do with social or economic status although this has an effect too.

That summer born children were at a disadvantage in streamed schools was demonstrated by Jinks in 1964. Using the whole age-range in streamed schools in one county borough (1315 children), he showed that the chance of being in the 'A' stream varied with the month of birth.

	Distribution according to season of birth			
	Sept.-Dec.	Jan.-April	May-Aug.	Total
'A' stream	228	203	155	586
'B' stream and lower	201	250	278	729
Total	429	453	433	1315

Children now begin full-time education in the term closest to their fifth birthday. Thus children born in autumn enter school five autumns later. They are joined in the intake class by their fellows, born in the winter, then by those born in the following spring and summer. The summer born children turn out to be the less fortunate individuals simply because, *right through education*, they will be the youngest in their year group. They will also have had less education (as far as time goes) when they move to the junior school. This has been called, rather dramatically, 'the scandal of the summer born!' By the time they move to the junior school, the summer born child will have had only seven terms of education compared to nine for the child whose birthday is in the previous autumn. These children also tend to spend their first term in far larger classes than their friends who entered earlier.

The Plowden Committee in its report *Children and Their Primary Schools* suggested both long term changes and interim measures to combat this state of affairs, so seriously was it regarded.

The committee suggested that the remedy was to allow children to start school part-time, in small classes, and that compulsory education ought to begin on a single starting date, 'the September term following the fifth birthday'. There would be a three-year course in all 'first' (now infants') schools.

The committee also proposed that the first term after the normal time of entry should, at the discretion of parents, be half-day attendance only. The year 1970 was to be the target for this scheme. As interim measures towards achieving this change, it was proposed that those reaching the age of five between February 1st and August 31st should start school in the following September, at the median age of five years three months; and that those reaching five between September 1st and January 31st should start in the following April, at the median age of five years five months. Part-time attendance would also be available for up to two terms before full-term entry and, again at the discretion of parents, a child was to be allowed to attend part-time, up to the age of six. Not one of these proposals can be put into effect until there is sufficient nursery school provision for all children whose parents are likely to want it.

And so we have had three separate groups joining up and moving towards the crucial age of 11. They may or may not be streamed (happily they usually are not!).

If they are streamed the effects begin to show at the start of junior education when Miss Smith's class of brightest (quickest?) infants becomes Miss Brown's 'A' class of more intelligent (quicker?) juniors. Similarly Miss Jones' class of not so bright infants becomes Miss Black's 'B' class.

Care and attention (albeit subconscious) is lavished on the 'A' group (which may not be called that, but who is fooling whom?) and they 'pass' the 11+ if there is one, while all the 'B' group fail (in fairness it should be said that there is an age weighting in the 11+ tests).

In the absence of 11+ testing, the continuity of failure may be less obvious. But unless something positive is done to correct it, many of the lower streams or 'sets', of our new comprehensive schools will still be composed of children born in the summer, and among the youngest of their age group!

A Matter of Opinion

What status does the profession 'teacher' have in the mind of the public in Britain and abroad? Figures in the Gallup Poll Bulletin for November, 1968, suggested some answers to the question.

Of those asked the question: 'If you had to give advice to the young, would you, yourself, advise them to go in for teaching as a career or not?' Fifty-seven per cent said they would, 30 per cent said they would not. In France and West Germany the percentage was higher than here (68 per cent and 69 per cent), while in Switzerland the status of the teacher must be very high indeed for 86 per cent of those asked answered 'yes', and only 10 per cent 'no'. For the USA the figures were much the same as Britain.

The poll also included questions about the school-leaving age and about the rôle of education. In Italy 57 per cent of those asked said they themselves had left school before they were 13 but only 3 per cent of them thought this stay was adequate. However, 33 per cent of Italians thought that 14 was old enough to leave school, and a further 20 per cent thought 15.

In Britain, 42 per cent thought children should remain in school until the end of their sixteenth year (20 per cent thought 15 a sufficient age). The end of the sixteenth year was also selected as the most desirable age to leave school by a majority of French, Dutch and Swiss.

The percentage of those thinking education until the age of 18 was desirable was quite high in Britain (15 per cent), and in Holland (17 per cent) and Italy (14 per cent). It was lower in West Germany, and Switzerland (7 per cent in each case).

As far as the role of education was concerned, respondents in France appeared to feel that the education given was adequate in a cultural sense (as they did in every country surveyed), but not in the sense of the formation of character (might they have had student unrest in mind?) or in preparation for a career. In Switzerland the pattern was the same, although the figures on whether preparation for a career is or is not satisfactory were closer (44 'is', 47 per cent 'is not').

In Britain a large percentage (68) thought our career preparation is satisfactory, and 53 per cent that it is satisfactory for the formation of character. In the other countries surveyed, West Germany, Holland, Italy and Switzerland these two criteria were also linked, but a rather smaller percentage thought what was achieved was 'satisfactory'.

Social Development Affecting Education

In the first Report of the Select Committee on Education and Science, the subject of which was HM Inspectorate (England and Wales), there is a phrase which attracts to itself a certain significance because it is used twice in quick succession. Both instances are in connection with what in the Committee's view is needed in the Inspectorate: 'Inspectors should be more in touch with *social developments affecting education*' (para. 42), and 'some inspectors are needed with special knowledge of *social developments affecting education*' (para. 48(8)). The phrase suggests a wide range of talking points.

For example, does the term 'social development' suggest that it is the changing structure or composition or environmental circumstances of our society that is involved? Such changes in society will probably have economic, political or even biological causes. Immigration, emigration, urbanisation, rural depopulation—all these

occurrences are social developments which can be attributed to economic and political decisions; certainly they have economic and political consequences.

Certain changes in society can be described with some precision and their effect on education may be simple and direct. Rural depopulation *must* lead to the closing of country schools. Immigration *must* induce changes of educational method and organisation in the areas where immigrants are received. But other social developments are more complex and obscure. Whether or not they are taking place at all may be a matter of dispute. Teachers may sense that they are in operation, but have difficulty in describing them with any precision, let alone assuming the confidence to analyse their effects on education. It is at this point of perplexity that the guidance of the sociologist may perhaps be sought.

Investigation has, for instance, recorded a decline in performance of the social act of church attendance, and this could be regarded as a social development. We cannot be certain that it is a development which affects education, but it has been suggested that the public opinion which seems to support compulsory religious observance within the educational system may be influenced by the decline in family prayers and family worship in church and chapel. Has the home become a more tolerant environment in which there is less violence, less physical punishment, less child privation? If this is in fact a contemporary social development its effect on schools is by no means clear. In some areas there may be more violence and more physical punishment in the educational system just because there is less in the home. If there is not in fact more, there is at least evidence of a demand for more from some quarters and a reluctance to impose restraint. From other areas there may be evidence, such as that adduced by Clegg and Megson, that the number of children neglected and in distress, is increasing with consequent problems for the schools.

Of all social developments affecting education, the most obvious is the simple increase in the number of children being born. The results have of course been momentous. They have included an increase in the teaching force. Does this mean a depression of the teacher's social status? The highest status clearly attaches to rôles which are unique and so through a descending scale to rôles which are so common that they are little valued. Few contemporary teachers enjoy the status once accorded to some village schoolmasters or to subject specialists in small-town grammar schools. There is of course no intrinsic reason why this should affect the quality of education, but status struggles may divert energies from other, more socially desirable objectives.

The growth of bureaucracy, or in Michael Young's famous phrase 'The Rise of the Meritocracy', is a social phenomenon common to all developing societies rich and poor alike. Development in this sense implies the application of trained and rational intelligence to economic and administrative problems. Such applications can only come through the agency of specialists. Societies have thus to acquire, cultivate and deploy to the best advantage many trained experts. The societies themselves will come to be increasingly composed of functionaries or bureaucrats who must possess the proper qualification for the rôle to which they have to be assigned. The social function of education is to supply individuals with these qualifications. The rational way of discharging this obligation is by tests of aptitude and attainment. Thus selection and examination processes may dominate the educational system.

This is a social development which (like the population growth) is bound to affect the educational system. Most teachers would want to reduce its influence on education to which they attach objectives more complex and more humane than the selection and training of recruits for the bureaucracy. But how is this to be done?

Sociologists have done valuable work in drawing attention to these developments and their educational implications. They have in particular emphasised the conflict between values imposed by society and the values to be found in the homes where children are reared. Their one tendency

which is not entirely helpful is to describe this conflict of values in terms of social class. It has been repeatedly emphasised that children of working-class parents are educationally deprived not necessarily because their parents care less about education but because they attend middle-class educational institutions, staffed by middle-class people, directing their energies towards middle-class ends. The implication is that working-class culture possesses certain social and moral qualities which are absent elsewhere in society. If this is so, and there is certainly evidence to support it, ought we not to identify these qualities and fight for their retention (or their introduction) into educational provision? An educational system dedicated to ensuring the rise of the meritocracy would be equally damaging to all classes of society and unequal only in finding it more difficult to convert working-class children into meritocrats.

Any analysis, however crude, of social developments affecting education provokes attention to educational developments that affect society and consequently to educational reforms that might effect beneficial changes in society. Thus one is confronted with the highly controversial question of the degree to which education should actively promote social, political or cultural change. Naturally there are some teachers and some inspectors who feel strongly that this possible function of education should be instantly realised. Others will feel that it is not the responsibility of educators to reform society or attempt a control over cultural developments. Some hold that the word education must denote some absolute and unchanging purposes altogether independent of any social or political objective deemed to be desirable at a given point in time. It is almost inevitable that the emphasis introduced into educational discussion by the sociologists will be on the social purposes that education serves. From this might emerge the conclusion that all educational judgements and decisions should be governed by what is thought to be their effect on social development. This is of course a tenable point of view, but one which may have disquieting implications for many teachers.

Children in Distress

Alec Clegg and Barbara Megson

Penguin Education Special. 4s.

A concern for the individual, particularly if he is under stress, shines through this book. As the Seebohm report and the White Paper *Children in Trouble* emphasised the rôle of the welfare services and stated the views of social workers, it is a timely reminder of the place of the school community in a child's life and of the positive rôle of education in developing and strengthening an individual's resources to combat disabilities and distress.

The book is in two parts, the first of which states the problems and illustrates them with poignant examples. Children in the large families of work-shy fathers are identified as a particular group at risk. There is an awareness that many children who need help do not attract it because of the corrosive effects of their environment on them and because their schools may be preoccupied with limited material goals.

The second part of the book sets out to explore solutions. It is rather a mixed bag of specific and general remedies, strengthened throughout by the first-hand experiences by heads of schools, and by a genuine feeling for the weak, the less able and the unfortunate. The authors see the way ahead as a combination of improved educational experiences and more enlightened attitudes and values expressed through an accumulation of attention to the details that help each individual feel a valued member of the school community.

This is an uneven book but its heart is in the right place and its priorities, school-based prevention before crisis-orientated social service cures, clearly make sense. It

should stimulate lively and valuable discussion in many places. Throughout, the school is seen as a powerful source of influence and a potentially strong source of sensitive help for those in trouble. In particular it can meet many needs without involving complicated administrative procedures. Schools can do something for children in distress *now*.

J.R.F.

The Learning Society

by Robert M. Hutchins

Pall Mall. 30s.

This is a short book by a great American educator, wise, lucid and profound. It concentrates on the nature of the educator's duty and in the chapter on the problem of how an autonomous intellectual community can be held to its duty, has relevance both to polytechnic development and to the rôle of the universities in Britain. It is startling to find as a conclusion to a discussion of the views of Marx and Dewey—'they both want liberal and liberating education for everybody and of a kind appropriate to the modern age—but Dr Hutchins does show that Marx-Leninist educational concepts were not originally intended to be vocational and specialist and that Dewey did not mean to obscure the differences between education and training.

Education, Hutchins argues, should not be instrumental; it is work and not a preparation for work; it cannot stop at any given date or rest on any particular achievement. 'We know that brutalisation and stupefaction can occur at any time of life. The way to stay human is to keep on learning.' And what we have to learn is 'how to live wisely, agreeably and well.'

There is a short but illuminating passage on British polytechnic plans in which comparisons with the Morrill Act and the land-grant colleges is drawn. They are not encouraging, but from America it is seen as a great and indeed unexpected achievement that the autonomy of English universities has continued in spite of their financial dependence. If the universities can adapt themselves to modern conditions which include the existence of a Secretary of State for Education and Science and a Prices and Incomes Board, while retaining the vitality of free institutions, and if the polytechnics can provide a liberal education as a concomitant to professional study, then as Hutchins generously suggests what we do 'may perhaps be an example to the world.'

D.M.H.

Readings in Measurement and Evaluation

N. E. Gronlund (Ed.)

Collier-MacMillan Ltd. 45s.

The scope of this book of 450 pages is set out in the preface as follows: 'Selecting readings from the voluminous literature on educational and psychological measurement is no simple task. The following criteria were used in selecting the readings for this collection. The selections must (1) contain authoritative material basic to the major areas of measurement studied in the beginning course, (2) be understandable without a background in statistics, (3) emphasise basic concepts and principles, rather than the use of specific instruments, and (4) be written in an interesting and lucid style. Within this general framework special attention was given to recent articles, and approximately 80 per cent of those included were published in the 1960s. The final decision also had to take into account comprehensiveness of coverage and balance in each of the major areas. Because of space limitations, and other considerations, it was necessary to omit material on rating scales, anecdotal records, and similar nontest methods of evaluation.'

Altogether there are 48 articles, which, with some joint authorship, are drawn from the work of more than 50 American writers, of whom Anastasi, Cronbach, Guilford, Hagen, R. L. Thorndike, and Tyler are perhaps those who are best known outside the United States.

The book can be strongly recommended to readers who wish to gain a general impression, or, as the authors would say,

an overview, of the prodigious and manifold activities of educational researchers in the United States. The eight sections, of roughly equal length, are under the heads of the measurement and evaluation process, the construction of classroom tests, the interpretation of test scores and norms, validity and reliability, standardised testing, using the results of measurement, and trends, new developments and current issues. It would be absurd to attempt, in a brief review, to give any summary beyond this.

In this country it is often believed, with some justification, that American writers have an undue tendency to think that problems can be solved and therefore lack a proper scepticism towards the solutions proposed. One or two of the articles in this book support the belief, but a reading of Thorndike on 'Creativity', or of Anastasi, on 'The Anti-test Revolt' will show that it is not always true, and many other contrary instances can be found. Most of the writers recognise that the questions with which they are dealing are immensely complicated, that the evidence is imperfect and partial, and that the recommendations must therefore be tentative. But they do not allow this critical temper to push them to the point of complete scepticism and paralysis. On the contrary, they make many recommendations, both for the classroom and for the background of education. The consideration of these recommendations, and of the evidence on which they are based, will not be a waste of time.

Experimental Design in Education

D. G. Lewis

U.L.P. 35s.

This book by Dr. Lewis seems likely to prove a very useful work. It provides, to quote the preface an account of the ideas underlying the design of experiments in education. The need for such a book is evident from the increasing attention now being given to educational research, and the consequent necessity to provide further training for teachers and social workers in the techniques of experimentation. A related consideration is that up to the present almost all the books on experimental design base their accounts on illustrations from the fields of industry, agriculture or medicine. It is hoped therefore, that the present book, written largely —though not exclusively—for the research worker in education, will serve a real need.'

Randomised Groups

After some preliminaries the book gets into its stride with chapters on randomised groups, nesting designs, crossing designs with randomised blocks and with factorial arrangements, designs with nesting and crossing, and Latin square designs. In each case the purpose of the design is first explained, then an example is given, and worked out to show the method of computation, and finally the model is given in symbols.

Frequent warnings are given against the danger of generalising beyond the point that the evidence justifies. Thus in the chapter on randomised groups it is said, 'It is well to appreciate the limitations in our conclusion. This conclusion—that the differences among the methods may reasonably be considered non-chance—relates only to the pupils of the given year group within the particular school, and to the methods as taught by the teachers in that school. Indeed, if all the methods have been taught by the same teacher, the significance of the method differences relates only to the methods as taught by that teacher. And if, on the other hand, the groups have been taught by different teachers randomly selected from the panel of teachers in the school, the significance of the differences relates to the methods as taught by members of that panel. To generalise to pupils from other schools (who may have grown used to different teaching methods—methods that would effect their response to the particular methods investigated) is not permissible. This is why a randomised groups design, such as that employed in a simple methods experiment, has few direct applications in educational research.' Another useful warning occurs in the chapter on Latin squares, where stress is laid on the difference

between agricultural and educational experiments in the likelihood of interactions. The author is perhaps unduly sanguine when he says that 'it is hoped that even those averse from mathematical expression may follow the main themes of the book,' but a student who works through the examples, with due attention to the warnings against over-generalisation, will have acquired a good deal of insight by the time he reaches the end of the book. To have made this possible, in no more than 185 pages, is an achievement on which Dr Lewis should be congratulated.

If he is an experienced teacher the student will have seen the difficulties that attend the application of these experimental designs in education. The difficulties are partly ethical and partly practical. The ethical difficulties are, broadly speaking, the same as in medicine. The practical difficulties arise because school organisation cannot easily be disrupted, and because teachers do their best work when they believe in it. On the first count artificial randomisation is unwelcome in schools; on the second it is apt to be ineffective. These objections do not cover the whole field—for example, they do not apply to that important part of the field which is concerned with experiments on programmed learning—but they cover a large part of it. For these reasons there is much to be said for covariance designs, in which the investigator takes the situation as he finds it, and controls by regression instead of by reorganisation. Dr Lewis devotes his final chapter, which is excellent so far as it goes, to this subject. It is to be hoped that when a second edition is called for this chapter may be greatly expanded. On pages 185 through 188 the advantages and disadvantages of artificial randomisation and covariance are set out, and the conclusion reached that 'the analysis of covariance should be preferred only when practical considerations militate against the use of randomised blocks, and when confidence is justified that its more restrictive assumptions are satisfied'. This statement needs some qualification. In the first place the cases where there are practical, and ethical, objections to the use of randomised blocks constitute a large majority of cases. Secondly the 'more restrictive assumptions' can be largely removed by the use of dummy variables and the insertion of second order terms in the regression equation when they are called for. It is true that these additions, when needed, will complicate the regression, but the circumstances that call for them will equally complicate the procedure by randomised blocks and, furthermore, if the evidence shows, as it may well do, that the complications were not in fact needed, they can then be dropped from the regression analysis with no harm done beyond a little extra calculation, whereas in the other pattern they will have complicated the organisation and the disruption of routine from the beginning. Again, as Dr Lewis points out, the amount of organisation, and disruption of routine, needed for artificial randomisation increases very rapidly with the number of variables. With regression methods, on the other hand, the only limitation on the number of variables is that it should be a small fraction of the number of available degrees of freedom.

In the opening chapter Dr Lewis remarks that 'Statistical error in the social sciences may be viewed as a result of the perversity of human nature'. This is neat and ironical, but perhaps too highly compressed. The real justification for lumping different kinds of unanalysed variation together under the heading of 'error' is that it is well understood that in statistical usage 'error' means 'wandering', as in 'we have erred and strayed like lost sheep', or in 'knight-errantry'. This usage, like so many in statistics, is perhaps unfortunate. At any rate it is apt to perplex the beginner, and the layman, unless the etymology is made clear. It would be unfair to Dr Lewis not to add that he goes on to give illustrations from which the reader could infer the point, if it occurred to him.

G.F.P.

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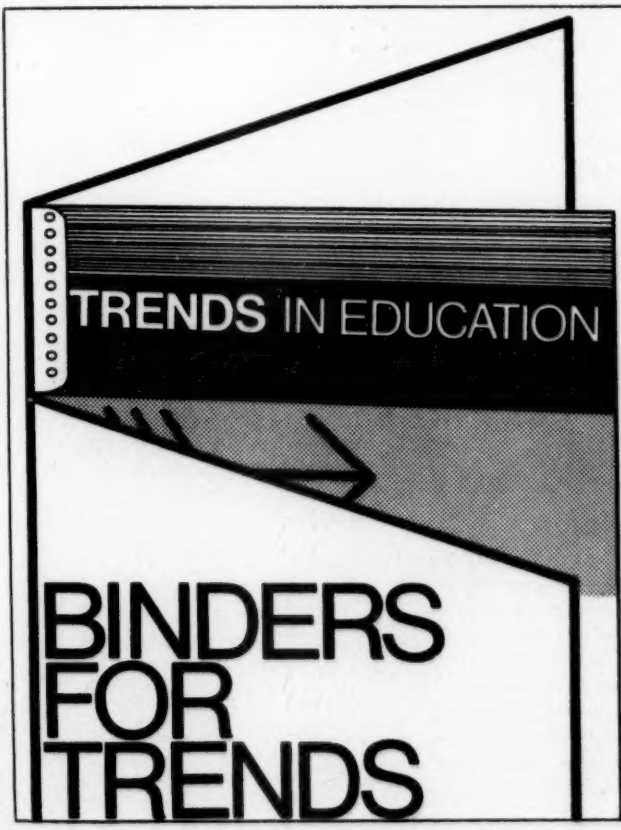

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